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## GYNECOLOGICAL MALIGNANT DISEASE\* Some Problems in Treatment

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THE object of this paper is to discuss some of the problems which are met in the handling of gynecological malignant disease. These are not only problems related to the diagnosis and handling of specific neoplasms but are often problems of a general nature which are shared by those who handle malignant disease elsewhere in the body. It would seem wise to establish before a group such as the members of the Clinical Club at least the development of the attitudes of the gynecological group toward these problems.

Certain facts should be clearly stated at the outset in order that later confusion may be avoided. In the first place, while a few broad general principles are applicable to the tumor problem as a whole, these must always be qualified when applied to specific tumors. It requires no further argument to establish the fact that each tumor type is a distinct entity and that variations in natural history and the diagnostic and therapeutic problems are so great that attempts to apply general principles from one to another are not well based. A clear and precise knowledge of the available information in regard to any individual tumor is a sine qua non for its adequate handling.

The second important point to be made will perhaps strike you as absurd. It may seem strange that accuracy should be demanded in the handling of a disease condition about which so little of a fundamental biological nature is known and where therapeutic failure reaches such magnitude. Very considerable degrees of skill and experience are required for diagnosis and in the

carrying out of either radiological or surgical therapy of malignant disease. In all of these fields carelessness or unwarranted pretense of authority leads on to serious disaster from which there is likely to be no returning. It is quite clear that the first attack in the matter of histological diagnosis and surgical or radiological therapy is all important. Chance for subsequent fruitful correction of errors in these fields is almost hopeless. For the most part, the surgical technics in the tumor field are delicate and extensive. The radiological attack involves working in a narrow range beyond which too little or too much are equally disastrous. The results of second attempts with either radiation or operation are too well known to require further discussion. The intelligent individual working in this field will develop a serious sense of humility and an earnest desire for accuracy and constant vigilance. He may perhaps be pardoned for some lack of tolerance for the ill-equipped amateur who goes blithely on his way "where angels fear to tread."

The third point which might be made at the outset has to do with an all too wide acceptance of the principle that control of the tumor patient can be efficiently divided into three separate and distinct divisions. There is no reasonable justification for the radiologist, the clinician and the pathologist each ignoring the others' fields. The ultimate ends of our struggle are the welfare of the patient and the progression of knowledge. Both of these are served by a constant check of one group on the other and the sharing of problems and information. It is one's opinion that efficiency is not complete until each group

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is able and willing to accurately and critically evaluate the problems of the other two. It might be pointed out that those in the three groups who work with gynecological tumors have rather by accident than by design, progressed further in this direction than those in most but not all other fields. This is probably due to two fortuitous circumstances. The German school has until recently led modern gynecological thought and has bequeathed to us the concept of a histological and physiological base for the specialty. The peculiar features of cervical carcinoma made it attractive as a proving ground for radiation therapy. Radiology and histology early became accepted as half-brothers by gynecology and have by and large magnificently accepted their new tasks and relationships. The three must now understand one another entirely if a stable basis for progress is to be laid. Already a new child of astounding proportions, the radio-physicist, is well on his way toward confounding the family peace. And unless all judgment be false, we might just as well prepare bed space at once for new twins, the tumor physiologist and the tumor biologist. What a stirring family this is likely to be!

The scope of this paper necessitates the choice of only a few problems for discussion and no claim can be made to completeness. The old arguments about the relative value of surgery and radiation as a primary attack upon squamous cell carcinoma of the cervix and the question of the organization of tumor clinics will not be considered.

A problem which will require early consideration is the question of the hospitalization of the patient undergoing radiation therapy in the lower abdomen. One can speak feelingly about this in view of experiences with both out-patient and in-patient therapy. There is every reason to believe that there is value to be obtained from modern massive radiation therapy. In the author's own short experience the x-ray dosages have been nearly doubled. Where this is applied as in the pelvis with large fields and resultant large volume dosage, a considerable number of serious side effects appear which must be recognized and treated early and efficiently if the patient is to be protected and if the therapy is to be continued so that the biological dosage is not to be spoiled by disturbances in the time factor and relative recovery rates. It has been learned that skin, blad-

der and gut can be protected by control of the necessary factors and these are scarcely applicable except by institutionalization. Protection from the spread of infection by local procedures and accurate observation of early danger signs can be carried out efficiently only with the patient under complete control. The early recognition of red cell, lymphocyte and granulocyte destruction is of great and occasionally vital importance. Recognition of the necessity for the preservation of normal tissue in a sufficiently healthy state so that it can recover and scar effectively, has not only had an influence on the determination of dosage but has produced an awareness of the necessity of controlling anemias by food and transfusion. These are not out-patient procedures and it is suggested that routine hospitalization is essential to efficiency and massive dosage.

Two questions will immediately arise. Is massive dosage, as it is used at present, justifiable? And is it economically possible to institutionalize all such patients that require this form of therapy?

All the weight of experimental, theoretical and clinical evidence presently available, would seem to entirely support the massive dose technics. Schmitz, of Chicago, who has carried the dosage in pelvic x-ray irradiation well beyond those ordinarily used, has been able to show survival rates which are better than those previously obtained and it may well be that we are headed for still more massive therapy. It should be understood that increase in dosage must be measured, insofar as possible, in terms of biological dosage. Increasing physical units of energy delivered alone, does not constitute increase of biological dosage. At the University of Minnesota Hospital relatively small dosages have been previously applied. The recovery rate in squamous cell carcinoma of the cervix under those conditions has been found to be 20 per cent. If this is an adequate sample, as there is every reason to believe that it is, massive dosage may be expected to increase that by 50 per cent and there is some hope in the survival rates to date that this is being attained.

The economic possibilities bring up questions which are not yet solved. What is perfectly clear is this. If an improvement in recovery rates can be demonstrated for the institutionalized patient, and I believe it can, then some method of institutionalizing them must be found.

It is rather surprising that there is not general agreement on the order in which x-ray and radium should be given in such a lesion as cervical carcinoma. There is a very definite primary mortality associated with radiation in this disease and the great majority of these patients die from infection spread. Occasionally, tuberculosis is present in the pelvis and sudden massive dosage will spread this about in a disastrous fashion. The use of preliminary x-ray in divided doses allows the physician to watch the patient's response and to manipulate the dosage as required to meet disturbances as they become evident. During the four weeks approximately during which x-ray irradiation is given, the infected tumor mass is for the most part sloughed away and clinical experience has taught that it is then safer from the point of view of infection spread to apply intra-uterine radium containers. It is also possible that the castrated tumor cells will show to a lesser degree than those which have not been radiated, the undesirable response to trauma which is so well known.

This same question of the effects of trauma upon tumor spread has been raised in considering the desirability of preliminary biopsy. Some authors have reported observations in which biopsy was followed by explosive widespread metastasis. It is clear that this is an occasional occurrence in non-traumatized tumor. Dr. Robert Meyer has studied surgically removed breast cancer which had been biopsied without finding evidence of fresh metastases. The value of biopsy in diagnosis is clear and many serious errors will be avoided by its use. But the experimental evidence in regard to the disturbances brought about by trauma to malignant tumor is also clear. It would seem that biopsy should always be carried out but it should be associated with an absolute minimum of trauma. Some form of cutting current loop recommends itself for this purpose.

The question of the control of dosage and its division, as applied to tumors at depth in the pelvis at least, will not be well based until more is known of the biology of the absorption of radiation energy. It has been gradually established by clinical experiment that the best results can be obtained with maximum doses in such lesions as cervical carcinoma. By maximum doses one means the maximum amount which can be delivered without too great an incidence of permanent damage to other organs and which will still leave surround-

ing connective tissue in a sufficiently healthy state so that it may recover and react by proliferation. This is spoken of as massive dose therapy. This must be considered in terms of biological units and not in physical units. Unfortunately we have no method of correcting the variables, physical units and time into a biological unit product. For that reason, there has been a general tendency to standardize the time factor for x-ray and for radium in a dogmatic way to get rid of the variable time factor and to vary the biological dosage in terms only of physical units. This would recommend itself more to reason if there were sound experimental confirmation for a choice of time factor. With the exception of certain skin tumors and tumors of the larynx, pharynx and tonsil, there is no very clear cut clinical information to support the superiority of the single dose method of Wintz, the prolonged therapy of Coutard or the generally accepted American division for pelvic tumors of twenty-five to twenty-eight days. Many clinical investigators have chosen this and hold to it so as not to disturb the time factor. Physical units of dosage are then varied until a maximum dosage is determined which will, for example, produce not more than 2 per cent of rectal strictures or a 1 to 2 per cent primary radiation mortality.

Similar rules are applied to surface radiation therapy from radium or radon. An arbitrary time of 100 hours is chosen which is adhered to in all cases. The variables then are the number of milligram-hours and the distribution. Distribution is fairly adequately corrected by equivalent adjustment of the milligram-hour total so that biological dosage at the desired site is controllable by varying only one factor, the number of milligram-hours. For so-called surface irradiation with radium or radon, wherever possible, a standard focal distance of one centimeter is used throughout. By adjusting active radiation length and milligram-hours, a single factor is left and biological dosage may be adjusted by varying this.

It should be understood that by dosage, there is meant the only possible interpretation of that, which is the dosage delivered to the tumor or a chosen point related to it which is to be treated. It is just as silly to speak of x-ray dosage to a cervical carcinoma in terms of the number of physical units given to the skin of the abdomen as it would be to speak of the dosage to a surface tumor by radium in terms of milligram-

hours without reference to distribution, active radiation length or focal distance. To reduce it to the absurd is to compare it with the statement that the reading light from an electric lamp can be expressed in physical terms of the current flowing through it and quite irrespective of whether the material to be read be placed beside the lamp or across the street. This illustration may sound absurd and it is in most cases of x-ray dosage since those who use this form of therapy are skilled in its control. It is not absurd when applied to a large number of those who use radium and radon. These agents are more accurately controllable in the uterus, cervix and vagina than are x-rays. Known dosages are required and accurate charts are available for use. They are more honored by neglect than by use.

The conclusions are obvious. Each tumor and each patient must be individualized. The utmost possible accuracy must be applied and the various tools of accuracy must be used. It is only thus that the greatest possible salvage can be obtained.

A few interesting problems associated with specific gynecological tumors might be considered. These are chosen at random for their interest rather than any other reason.

The study of the origin of squamous cell carcinoma of the cervix has yielded no information comparable to that which has appeared from work on breast cancer. But a few bits of information are becoming clear. The old myth quoted from text book to text book that carcinoma of the cervix arises in cervical erosion has been exploded. This mistake was probably due to the fact that active erosion healing is all too often mistaken for carcinoma itself. Accurate study of early carcinomas show that, insofar as the genitalia, at least, are concerned, carcinoma does not arise in young but only in aging tissue. Primary squamous cell carcinomas are for practical purposes unknown in the squamous epithelium of polyps of the endometrium or cervix although carcinoma may become polypoid or may invade polyps. Neither is malignant degeneration seen in cervical erosions unless it has invaded them. But the great majority of early carcinomas arise in the old squamous epithelium at the margins of areas of erosion healing. The active repair processes associated with chronic inflammation do not pass over into malignancy. What effect the inflammation has in the production of malignant

change in the surrounding tissue is not clear. It would be wiser to hold the idea of the relationship sub judice for the present.

Dr. Robert Meyer has also demonstrated by the study of very early carcinomas here that the tumor always arises from the basal cells over a limited area. Whether it begins in a single cell or not cannot be determined. The tumor grows by cell proliferation from this point, destroying the normal epithelium at the circumference and above. It can be readily diagnosed before it has ruptured the basement membrane. The old idea that the demonstration of invasion is necessary for a diagnosis of malignancy in such tissues has again been shown to be wrong. It might be pointed out at this point that leucoplakia of the cervix is not an obligatorily so-called precancerous lesion and that cancer cells may show a secondary leukoplakic change.

It might also be stated that histological classification of squamous cell carcinoma of the cervix has not proved to be the useful tool which it was once hoped that it might be. The cellular differentiation is a secondary quality. By comparison with the invasive qualities and the degree of extension which are shared by all histological types it can scarcely be said to be of any importance whatever.

There are three problems in cervical carcinoma for which no adequate answer is available. These are problems of the tumor in young people, arbitrarily stated as younger than thirty years, the problems of the adenocarcinoma of the cervix and that of the tumor, recurrent after treatment.

Carcinoma of the cervix in young women has the same clinical significance as that in the breast in a similar age group. Growth is rapid, metastases are early and recurrences almost the rule. It is not clear why this should be. The author has attempted to change this series of events by the use of daily fever therapy during treatment, post-treatment radon seeding and extension to very heavy dosage. No certain results have been obtained. At present, the department of Obstetrics and Gynecology at the University Hospital is carrying out Wertheim operation four weeks after the completion of therapy in operable tumors in this age group in order to get a series for evaluation. It is quite certain that this age group should be given a separate and very guarded prognosis.

Strange as it may seem, there is no accurate



information as to just what treatment is most productive, or what results can be obtained in adenocarcinoma of the cervix. Some clinics have reported no cures whatever while others rank the lesion as similar for purposes of treatment and prognosis to the squamous cell tumor. This confusion is likely due to three facts. It is often impossible to tell from histological diagnosis alone whether a given adenocarcinoma arose from the cervix or the uterine fundus. The later may extend to the cervix. The difference in natural history, treatment and prognosis are common knowledge. One suggests that many cured cervical adenocarcinomas were in reality adenocarcinomas of the corpus. Secondly, there is an adenoma malignum which occurs in the cervix. It is not as widely recognized as it should be. But it extends slowly and only locally in the majority of cases for a considerable period of time. These are comparatively readily curable and undoubtedly are included in some of the adenocarcinoma figures. Strictly speaking, they are adenocarcinomas and will destroy the host if untreated. But the inclusion of a neoplasm with such a different natural history as this, with the adenocarcinomas has not helped toward clear thinking in the latter condition. A third source of confusion lies in the fact that adenocarcinoma of the cervix is undoubtedly overdiagnosed. Squamous cell tumors may take an adenomatous-like form under a number of circumstances which are not worth detailing here. All of this makes it likely that the more pessimistic reports approximate reality. Adenocarcinoma of the cervix is being treated by radiation therapy followed by Wertheim operation in operable cases, in the hope of increasing the salvage.

The problem of local recurrence can lead only to the conclusion that some tumors, and they cannot be recognized before treatment by any means presently available, are as completely radio-resistant as the surrounding normal tissue. These tumor cells have been exposed to dosages, not in biological terms but in terms of the simple summation of x-ray and radium dosage, of the nature of between 15 and 25 erythema doses and yet survive. There is a suggestion that the surrounding tissue reaction may be at fault. All of us have seen tumors in cachectic patients treated by radiation. The tumor is readily sloughed away but scarring is absent, a crater remains and the tumor recurs. This is strong evidence that the

healing of a tumor is in the final analysis a factor of normal tissue response, immunological response or some such factor. As has been suggested above, modern radiation therapy does not have as its primary aim the sloughing away of tumor but rather the interference with its reproduction, leaving the normal surrounding tissue in a state in which it can react. This should be the basis for dosage. It is assumed that healthy patients react similarly but there is no basis for such assumption and objective controls are lacking.

Under any circumstances, there is good basis for pessimism in attempts at repeat radiation for local recurrence and clinical experience lends bitter support to this view. Again, it focuses attention on the necessity for careful organization of the first attempt at treatment.

There is little to be said that is new or of promising interest in regard to carcinoma of the body of the uterus. It may seem trite to again state here that all uterine bleeding should be suspected of being due to malignancy until proven otherwise by histological means. It is hard to believe that any student could graduate without having attained that intellectual height. But they do. One thinks sometimes that ergot must have achieved first place in the treatment of this disease. Small bits of radium are applied in the delightful fancy that the lesion is a "functional bleeding," whatever that may be. And subtotal hysterectomies are done because a myoma is present. Adenocarcinoma in the cervical stump is not a nice disease.

This is perhaps the place to urge against the application of radium at the same time the diagnostic curettage is done. It is true that very often a diagnosis made on the gross material is correct. But it is also true that even frozen section reports on the same tissue are frequently in error. The same may be said of the negative diagnosis. Small doses of radium under these circumstances can only confuse the problems. And under any circumstances, radiation should for practical purposes never be used in the absence of an accurate diagnosis. This, the process of reaching a diagnosis in suspected malignancy, is the time to go slowly and carefully, taking only one step at a time as the way becomes clear.

It is becoming less and less likely as accurate information is obtained, that radiation therapy will constitute an acceptable primary attack upon adenocarcinoma of the uterine corpus. For about

five years the author has routinely subjected these patients to preliminary x-ray and radium radiation, followed in about four weeks by panhysterectomy. This allows accurate study of the results of the radiation. It has shown that with adequate x-ray and adequate distribution of the radium (which is not satisfied by a tandem applicator, be it noted), tumor which is confined to the surface has disappeared so far as microscopic study can determine. This does not necessarily mean that all tumor is gone.

On the other hand, tumor which has invaded the uterine muscle will sometimes show no morphological evidence of radiation effect. There is no way of determining which tumors have invaded and which have not. Tumor in the muscle

is more dangerous than that on the surface since it is clinically silent. The operation carries only a 1 per cent mortality when very accurately controlled from the point of view of infection and offers in the operable cases a 60 per cent cure rate. The operative attack is still the standard method of treatment.

The department is planning very shortly to change the procedure at present employed and to substitute preliminary radium irradiation alone, followed by operation. It is likely that this will offer all of the advantages of the more thorough irradiation in the direction of cleaning up infection before operation. Under any circumstances, interesting comparable information will be forthcoming.

### BRONCHIOGENIC CARCINOMA\*

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**B**RONCHIOGENIC cancer has become the most interesting pulmonary disease of the present day. This is the result of three facts. In the first place, within a quarter of a century, cancer of the lung has developed from a rarity to a disease of comparative frequency. Secondly, as a result of its rise to prominence, thoracic surgery has become the treatment of choice rather than the court of last appeal. And thirdly, pulmonary cancer is to chest diseases what syphilis is to systemic syndromes, the great imitator. In order to present these and other features, a résumé of all aspects of pulmonary cancer will be outlined in this paper.

#### Historical Data

Bronchiogenic cancer can be traced back to the writings of Agricola in 1521. Mathesius, in 1559, and Pansa, in 1614, described cases which later were proved to be pulmonary malignancies. These were the Schneeberg mine cancers, and were not recognized by the authors as true pulmonary cancers. So, priority in describing bronchiogenic carcinoma belongs to Morgagni, who, in 1761, described a case in which necropsy

revealed a cancerous ulcer of the lung. The second authentic pulmonary cancer was reported by Bayle in 1810. By 1878, the number of cases recorded in the literature, as reviewed by Reinhardt, had increased to twenty-eight. Since then, the number has gradually increased until at present the disease is no longer a rarity.

#### Incidence

Both the actual number of pulmonary cancers reported and a constantly growing literature on the subject reflect an increased frequency of these neoplasms. However, more than these evidences are required to determine whether the increased incidence is absolute or relative. Many investigators claim that the increased frequency is due to improved clinical acumen, greater interest in the disease, and increase in the number of postmortem examinations. Those who believe that an actual increase has occurred, maintain that the percentage increase of pulmonary cancers in all autopsies, and, above all, a percentage increase of pulmonary cancer in all cancers found at autopsy, prove irrefutably the reality of the increase.

In the United States, England, Germany, Switzerland, France, Russia and Argentina data have been presented proving both an increase of

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pulmonary carcinomas in all autopsies and an increase in the percentage of all cancers found to be primary pulmonary cancers. Thus, then, a preponderance of evidence from widely scattered countries shows an absolute increase in the incidence of these neoplasms.

### Etiology

In reviewing the causative factors, fourteen different etiologic agents have been found in the literature. Without exception, all of the suggested causes have one common quality, the production of chronic pulmonary irritation. Chronic irritation may be chemical, mechanical, bacterial, radio-active, or thermal. Several of the causes or possible causes may be classified under two or more of these headings, but all of them fall under at least one. Since the suggested causes are so diverse, the only conclusion possible is that irritation, which is common to all of them, is the real causative agent in the disease.

### Pathology

From 75 to 90 per cent of these cancers arise in the large bronchi two or three centimeters from the tracheal bifurcation. These are known as the hilar or central type. The rest arise from the terminal bronchioles, and are known as peripheral pulmonary cancers. Their size varies from small outgrowths of the bronchial mucous membrane to tumors the size of a man's head. The larger tumors are soft and not unlike caseous tuberculous masses, sometimes with cavities filled with mucus, pus or necrotic material. Those containing many mucous glands are softer and more slimy than the others, as are also their metastases.

Within the past few years, the "oat-celled" tumors of the English have been reclassified as pulmonary cancers. At present, most of the superior pulmonary sulcus tumors are conceded to be cancers of the lung originating in the terminal bronchioles. Now, also, many endotheliomas of the pleura have been proved to be actual pulmonary carcinomas. The significance of these findings is that even within comparatively recent years, three pathological entities have been reclassified as pulmonary carcinomas.

Histogenically, also, much progress has been made in recent years. Previously, pulmonary carcinomas were thought to have three cellular origins: the bronchial epithelium, the bronchial mucous glands and alveolar epithelium. The

present consensus of opinion is that all pulmonary cancers, regardless of the predominant cell type, arise from the basal cells. Consequently, the previous triad of origin has been replaced by the present unicellular concept.

### Clinical Considerations

**Symptomatology**—All of these tumors arise within a bronchus, and, therefore, obstruction of the flow of air into or out of the lung becomes the principal mechanism in the production of symptoms. Two other factors in the cause of symptoms should be mentioned. First, as with cancer elsewhere, ulceration and hemorrhage are among the first evidences of these tumors. Secondly, the bronchiogenic cancer simulates a foreign body which nature is trying to extrude, so cough, either with or without sputum, is one of the most frequent manifestations.

The symptomatology may even suggest the location of the carcinoma. Cough and hemoptysis result from ulceration of tumors of the larger bronchi. In the peripheral tumors, cough either is entirely absent or occurs late as a result of pressure on a large bronchus. Paterson has stated that the blood-cough complex is characteristic of the central type, and pain is the early typical symptom of the peripheral type.

The frequency of symptoms in 1,456 cases so analyzed was as follows:

Symptom	No. Cases Analyzed	No. Cases with Symptom	Percentage Cases with Symptom
Cough	1376	996	72.3
Sputum	1217	822	67.5
Pain	1439	861	59.8
Dyspnea	1299	716	59.7
Emaciation	1187	573	48.2
Pyrexia	1112	477	42.8
Hemoptysis	1456	583	40.0

Other symptoms such as dilated veins, cyanosis, night sweats, vomiting, hoarseness and clubbed fingers occurred with varying frequency in less than 20 per cent of the cases. Thus, it is seen that cough occurs in three out of four cases; sputum, pain and dyspnea in three out of five; and fever and hemoptysis in two out of five cases. While emaciation occurs in almost 50 per cent of these patients it is usually a late manifestation and should not be expected early.

Certain symptoms or groups of symptoms should lead one to suspect the diagnosis. For instance, pain in the chest which is persistent

and not relieved by strapping should arouse suspicion. Dyspnea is one of the most frequent complaints that directs the patient with pulmonary cancer to the physician. One clinician has stated that hemoptysis is as suggestive of carcinoma of the lung in an adult as of tuberculosis in a younger person. In any atypical pulmonary disease in an adult, especially if characterized by cough, pain, dyspnea, or hemoptysis, pulmonary cancer should receive first consideration.

*Physical Signs.*—The most frequent early signs discovered by examination are decreased mobility of the chest, dullness or flatness extending outward from the hilus, and suppressed breath sounds. One day breath sounds are heard accompanied by râles while the next day either or both will have disappeared. This variability is characteristic of the disease.

On inspection, breathing is labored and chest movement lags or is absent. Unilateral limitation of expansion is frequently seen. If the disease has advanced far, asymmetry of the chest is present. When effusion is present, the intercostal spaces may bulge. In the late stages, the veins of the chest wall are distended, and edema of the face, neck, arms or hemithorax may be visible.

Tactile fremitus usually is decreased or absent on the diseased side. It may be increased on the unaffected side. The cardiac impulse is usually displaced toward the pulmonary lesion. Tenderness of the intercostal spaces can often be elicited. Enlarged glands may be palpated above the clavicles or manubrium sterni or in the axilla.

Percussion usually produces a dull sound, or, if obstruction is complete, a flat note. Dullness is often found an inch or two to one side of the sternum with a normal area between the dull space and the clavicle. Staehelin has said that a circumscribed area of dullness with decreased breath sounds and vocal fremitus indicated almost certainly the diagnosis of pulmonary cancer. Nowhere else in pulmonary diseases is found the hard stony resistance in percussion that is noted in pulmonary cancer.

In auscultation, the most typical finding is suppressed or absent breath sounds. When a tumor closes or fills a bronchus, collapse of the part of the lung supplied by that bronchus takes place. Then, breath sounds are absent and both vocal and tactile fremitus are diminished or absent.

### Differential Diagnosis

Pulmonary cancer can simulate any intrathoracic disease. Consequently, any intrathoracic disease which does not run a typical course or which produces atypical symptoms or findings should lead one to suspect a bronchiogenic carcinoma.

Pulmonary cancer is to be differentiated from three groups of diseases: (1) those pulmonary diseases caused by micro-organisms; (2) those diseases involving the hilar and mediastinal structures; and (3) miscellaneous vascular and other lesions. In the first group are to be found tuberculosis, bronchiectasis, unresolved pneumonia, lung abscess, echinococcal cysts and mycotic diseases. Among hilar and mediastinal diseases to be differentiated from pulmonary cancer are Hodgkin's disease, lymphoblastomas, mediastinal gummas and abscesses. And in the third group are benign tumors, carcinoma of the trachea and esophagus, Pott's disease and tumors of the spine, and the various aortic aneurysms.

Since pulmonary cancer is most frequently mistaken for tuberculosis, some of the salient points in differentiating these two diseases should be mentioned. In tuberculosis, fever and tachycardia are usually present. They are absent except late in the course of bronchiogenic cancer or as a result of the complications it causes. Dyspnea is rare in tuberculosis, but frequent in cancer. In tuberculosis, there is usually little pain, yet this symptom is common in cancer of the lung, especially in the peripheral type. Tuberculosis makes its first appearance usually before the age of thirty-five; carcinoma appears most often after that age. Consequently, in tuberculosis appearing after the age of thirty-five, previous attacks can be elicited in the history.

Cancer usually spares the apices, whereas tuberculosis often involves them. Cancer is almost invariably unilateral, while tuberculosis is frequently bilateral. Impaired resonance with diminished or absent breath sounds is typical of cancer. Impaired resonance with bronchial breathing is characteristic of tuberculosis. In pulmonary cancer, the impaired resonance is flat, while in tuberculosis, it is dull. Râles are either seldom heard or are variable from day to day in cancer, but they are usually constantly heard in tuberculosis.



**Laboratory and Other Diagnostic Aids**

**Pleural Effusion.**—This occurs in from one-third to one-half of these cases. The fluid may be serous, purulent or bloody, and when it is the latter, pulmonary carcinoma is by far the most likely cause. None of the other effusions is so prone to fill the entire chest as is a cancerous one. Malignant cells can be demonstrated with sufficient frequency to make an examination of the fluid advisable.

**Sputum.**—In 1935, Dudgeon and Wrigley perfected a technic for the examination of sputum for cancer cells whereby they were able to demonstrate the histologic type of growth in twenty of twenty-six cases of proved pulmonary carcinoma. The finding of tubercle bacilli in the sputum does not refute the diagnosis of pulmonary cancer.

**Roentgenology.**—X-ray studies reveal two types of pulmonary cancer: the hilar or central, and the peripheral.

Hilar or central pulmonary cancers have two roentgenological characteristics that are of diagnostic importance. The first, hilar density, is unilateral, is roughly triangular with the apex pointing outward, and from the border strand-like processes radiate outward toward the lung periphery. This density usually lies opposite the space between the sixth and eighth ribs or at the level of the seventh rib posteriorly. The second characteristic, atelectasis, is a smooth, homogeneous density, anatomically limited and carrying the normal lung markings. The appearance of bronchiectasis, a mottled fan-shaped density at the costophrenic angle, also is suggestive of a bronchial tumor. In addition to these evidences, elevation of the diaphragm on the affected side, and displacement of the heart and mediastinum toward the pulmonary lesion are characteristic of atelectasis, and therefore suggest bronchial cancer.

In the less frequent peripheral type, the characteristic findings in the x-ray plate are either a solitary, round shadow in the lung field, or a massive involvement of one or more lobes. The solitary, circular form is recognizable as a dense, round area usually without the sharp-defined edge seen in the shadows of metastatic deposits. Such primary lesions are invariably single, which fact distinguishes them from metastatic growths.

The massive lobar type appears as a complete consolidation of a whole lobe, less dense than fluid, without mottling of any kind nor with the varied texture seen in most cases of lobar pneumonia. The border or edge is an irregularly infiltrating one.

In fluoroscopy, Polevski has described the following triad of findings as pathognomonic of pulmonary cancer: (1) elevation of the diaphragm on the affected side; (2) paradoxical or "seesaw" movement of the diaphragm; and (3) pendulum movement of the heart toward the side of the lesion in inspiration and away from it in expiration.

**Bronchoscopy.**—Conclusive proof of the diagnosis depends upon biopsy, which is best accomplished by bronchoscopy. Early diagnosis by bronchoscopy is possible in 75 per cent of these cases.

**Treatment**

Aside from palliative measures, the treatment of pulmonary cancer is either surgical removal or irradiation. Many authors consider irradiation as palliative only; others maintain that it is potentially curative; still others regard surgery as the only possible means of cure.

**Palliative measures** may be directed to the patient's general well-being, to complications and sequelæ, or to specific symptoms. Pain is usually due to pleural involvement and may be relieved by sand bags and strapping. Heroic doses of opiates are often required. Artificial pneumothorax, injection of alcohol or section of the dorsal roots may be necessary to relieve pain. Dyspnea and cyanosis are caused by increased pressure within the pleura. Aspiration of the effusion frequently provides temporary relief. The sitting position and lying on the diseased side may improve the shortness of breath. Cough may be influenced only by antispasmodic cough mixtures or opiates.

**Irradiation** consists either of x-ray therapy or radon seed implantation into the growth. Many radiologists believe that such treatment is the most effective so far devised from both a curative and palliative standpoint. Some writers however contend that the radioresistant cells of pulmonary cancer make such treatment ineffective and that immediate, palliative results of irradiation are usually followed by a more rapid downhill course which terminates in death.

*Surgical treatment* is divided into curative bronchoscopic procedures and actual surgical excision. Eleven cures have resulted from bronchoscopic excision, cauterization or radium implantation. However, opinion prevails that the type of tumors for which such treatment can be used composes a minority of pulmonary carcinomas. Therefore, it appears that wide excision rather than bronchoscopic treatment would be the treatment of choice.

Surgical excision is accomplished by either lobectomy or pneumonectomy. It is in the technique and successes of thoracic surgery that some of the most remarkable advances have been made during the past few years. For instance, in 1920, Sauerbruch compiled fifteen surgical extirpations of the lung. In 1934, Heuer found reports in the literature of 225 lobectomies and pneumonec-

tomies of which thirty-three were for pulmonary cancer. The present consensus of opinion concerning treatment of pulmonary cancer is that radical excision is the treatment of choice, and it alone offers a reasonable likelihood of cure.

In conclusion, mention should be made of the surgical personnel available to physicians practicing within the territorial boundaries of this society. Remarkable contributions to the field of thoracic surgery have been made by Alexander and Haight of Michigan, and by Graham of St. Louis. In fact, experienced and well-qualified thoracic surgeons are to be found in practically every state in the conference. Here in Minnesota, we are fortunate in having available as thoracic surgeons such widely recognized men as Kinsella, Wangenstein, Gardiner, Gray and Harrington.

### BONE MARROW BIOPSY\*

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SINCE Seyfarth<sup>29</sup> (1923) described a method of trephining the sternum and particularly since Arinkin<sup>1</sup> (1929) introduced aspiration biopsy, examination of the bone marrow during life has become an accepted diagnostic procedure in diseases of the hematopoietic system. Sternal biopsy is by no means necessary in all hematologic conditions but is frequently a valuable source of information in those instances where the diagnosis cannot be established on the basis of the usual clinical and hematological findings. Certain more or less well-defined limitations to the method exist and only with regard to these limitations can the usefulness of sternal biopsy be properly evaluated. It is intended here to briefly outline the findings in the more commonly encountered hematologic conditions where examination of the marrow may be of aid to diagnosis and at the same time indicate certain of the difficulties in interpretation of these findings.

#### Methods

Examination of the sternal marrow is advantageous not only because of the accessibility of that bone but because the hematopoietic activity

of sternal marrow is sustained throughout life (Custer and Ahlfeldt<sup>4</sup>) and in general is indicative of the character of the hematopoietic tissues as a whole (Stasney and Higgins<sup>30</sup>). Instances of irregularity of the composition of the sternal marrow may be encountered but material removed by biopsy may usually be considered representative.

Trephine biopsy consists in the removal of a plug of bone from the outer table of the sternum. The marrow adherent to its inner surface may be used for both imprints or smears and histologic sections. While this method affords excellent material for study, the required cutaneous incision is objectionable particularly if repetition of the biopsy is desirable or necessary. Furthermore, while the topographic relationships of the marrow are preserved in section, smears or imprints are indispensable for accurate identification of the various immature cells. Consequently the technically simpler aspiration biopsy has achieved greater popularity. Properly executed it causes but little more discomfort than does a venapuncture, leaves no scar and may be repeated as frequently as desired.

In aspirating marrow there is a certain amount of unavoidable dilution with sinusoidal blood.

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In hyperplastic marrows, and in any instance from accidental excess dilution, so few cells may be obtained that examination of the smears is very tedious and one may not be certain that the material observed is representative. In order to more uniformly provide adequate amounts of marrow for examination we have adopted at the University of Minnesota Hospitals a method of concentrating the cells obtained by aspiration. The technic is based on a method devised by Schleicher and Sharp<sup>26</sup> and further described by Limarzi.<sup>16</sup>

The sternal marrow may be approached either directly through the outer table of the manubrium or sternal body or through the sternomanubrial junction. All of these sites have been used but the sternal body in the third interspace or at the upper margin of the third rib is usually recommended. The structure of the sternum varies and no one site is satisfactory for all cases. The skin, subcutaneous tissues and periosteum at the elected site are infiltrated with procaine. A short 18-gauge spinal puncture needle is then forced into the bone at an angle of 45° (the point toward the head of the patient) until a sudden "give" indicates that the marrow cavity has been reached. The stilet is then removed and, with a tightly fitting, dry syringe (10 or 20 c.c. size), about 1 c.c. of material is aspirated. When the needle is properly placed the flow is prompt, steady and the patient usually experiences a "suction" pain. Unless such a flow is encountered the stilet is replaced and the needle shifted slightly in depth. If this maneuver repeatedly fails to result in a free return a new site is tried. Prolonged aspiration in the absence of a reasonably free return of fluid does not yield satisfactory material.

The aspirated material, composed of a mixture of sinusoidal blood, hematopoietic marrow and fat, is immediately transferred to a paraffined tube containing a minute amount of heparin as an anticoagulant. (Heparin is superior to other anticoagulants for it occasions less disturbance of cellular morphology.) A hematocrit tube is then filled with this mixture and centrifuged at from 2,000-2,500 RPM for five minutes. Centrifugation separates out the following layers reading from top down in the tube: (1) fat; (2) plasma; (3) myeloid-erythroid cells; (4) erythrocytes. The heights of the several layers are recorded. The fat and plasma are removed separately and discarded. The myeloid-erythroid

layer, together with a small amount of the erythrocyte layer is pipetted off separately, transferred to a paraffined watch glass, mixed, and from this material smears are made and stained with the May-Grünwald-Giemsa combination. As originally described the method called for the preparation of smears from a mixture of equal parts of myeloid-erythroid, plasma and erythrocyte layers. Thus the supernatant plasma is removed to the point where the height of the plasma layer equals that of the myeloid-erythroid layer and then the remaining plasma, myeloid-erythroid layer and an equal portion of the erythrocyte layer are removed together, mixed and smeared. More cellular smears are obtained by taking only the myeloid-erythroid layer, and as this material is often rather tenacious, smearing is facilitated by adding a small proportion of the erythrocyte layer. The manner in which this step of the technic is employed is largely a matter of preference. Occasionally there is no grossly demonstrable myeloid-erythroid layer and in such cases the extreme superficial portion of the erythrocyte layer is removed for the preparation of smears for it will contain what nucleated cells are present.

#### Cellular Composition of the Marrow

In discussing the cellular composition of the marrow under both normal and pathologic conditions it is necessary to refer at least briefly to the question of terminology, for the existing differences in terminology in hematological literature are a constant source of confusion.

We employ that used by Downey.<sup>8</sup> For purposes of orientation it may be briefly stated that the myeloblast is the stem cell of the marrow under normal conditions. From it are derived: (1) granular leukocytes through leukoblast, promyelocyte, myelocyte and metamyelocyte stages; (2) erythrocytes through pronormoblast, basophilic normoblast, polychromatophilic normoblast and orthochromatic normoblast stages; (3) megakaryocytes. Megaloblasts are never found in normal marrow. With very few exceptions they are peculiar to pernicious anemia in relapse and develop from the myeloblast into the usual macrocytic erythrocytes through promegaloblast, basophilic megaloblast and the orthochromatic megaloblast stages.

The cellular composition of the marrow is expressed in several ways. Such calculations as

the myeloid-erythroid volume, the differential count, the myeloid-erythroid ratio and the maturity dispersion are all used in analysis by various writers.

The myeloid-erythroid volume (M-E volume) refers to the percentage of the total column in the hematocrit tube made up by the myeloid-erythroid layer of cells. This determination gives some information concerning the activity of the marrow but in any one instance is of limited value. Limarzi,<sup>16</sup> for example, found an M-E volume of 5 to 8 per cent in normal individuals, 1.5 to 3 per cent in aplastic anemia, up to 40 per cent in pernicious anemia, up to 75 per cent in chronic myeloid leukemia, etc. The M-E volume will vary not only with hyperplasia and hypoplasia of the marrow but with the amount of sinusoidal blood obtained at aspiration. Consequently an elevated M-E volume, while indicative of hyperplasia, may not express the actual degree of hyperplasia, and a reduced M-E volume may mean only excess dilution and not an actual hypoplasia.

The differential counts reported for normal marrows vary considerably, as any of the several collected tabulations of different authors will indicate (Scott<sup>27</sup>). Normoblasts, for example, constitute 12 per cent of the nucleated cells in one author's normals and 30 per cent in those of another. One author finds 3.5 per cent lymphocytes, another 24.9 per cent. Similar wide ranges are reported in the several myeloid categories. Megakaryocytes are usually estimated at much less than 1 per cent of the total. A very few reticulo-endothelial cells and plasma cells may be found.

The myeloid-erythroid ratio is the proportion of myeloid cells to erythroid cells. This value also varies from author to author. Limarzi<sup>17</sup> found the ratio in normal individuals to vary from 1.75:1 to 3.75:1. Stasney and Higgins<sup>20</sup> found a ratio of 1:1. The maturity dispersion refers to the percentages of the total myeloid and erythroid cells respectively made up by the several maturation levels in each group. These values also vary from author to author. As an example, Limarzi's values are shown in the accompanying tabulation (his terminology has been modified to correspond to ours).

It is evident that the differential count, myeloid-erythroid ratio and maturity dispersions cover wide ranges as reported for normal individuals.

Myeloid:	myeloblasts and promyelocytes.....	2.5%
	neutrophilic myelocytes .....	15-20%
	neutrophilic metamyelocytes .....	20-45%
	mature neutrophils .....	10-25%
	eosinophils (all stages).....	2-5%
Erythroid:	basophils .....	Less than .5%
	pronormoblasts .. . . .	Less than 5%
	basophilic normoblasts .....	20%
	polychromatophilic and orthochromatic normoblasts .....	75%

Consequently only extreme alterations in these determinations are of significance. While the mathematical expression of the several values is very useful in detailed studies of the marrow under various circumstances, significant alterations, particularly as concerns the maturity dispersions, are apparent from examination of the smears and such calculations are in general unnecessary for diagnosis. Furthermore, just as in the examination of the peripheral blood, qualitative changes are of great importance. For example, the megaloblasts of pernicious anemia, and the abnormal myeloblasts (paramyeloblasts, monocytoid myeloblasts, etc.) peculiar to leukemia are frequently of greater importance than are quantitative changes alone.

### The Anemias

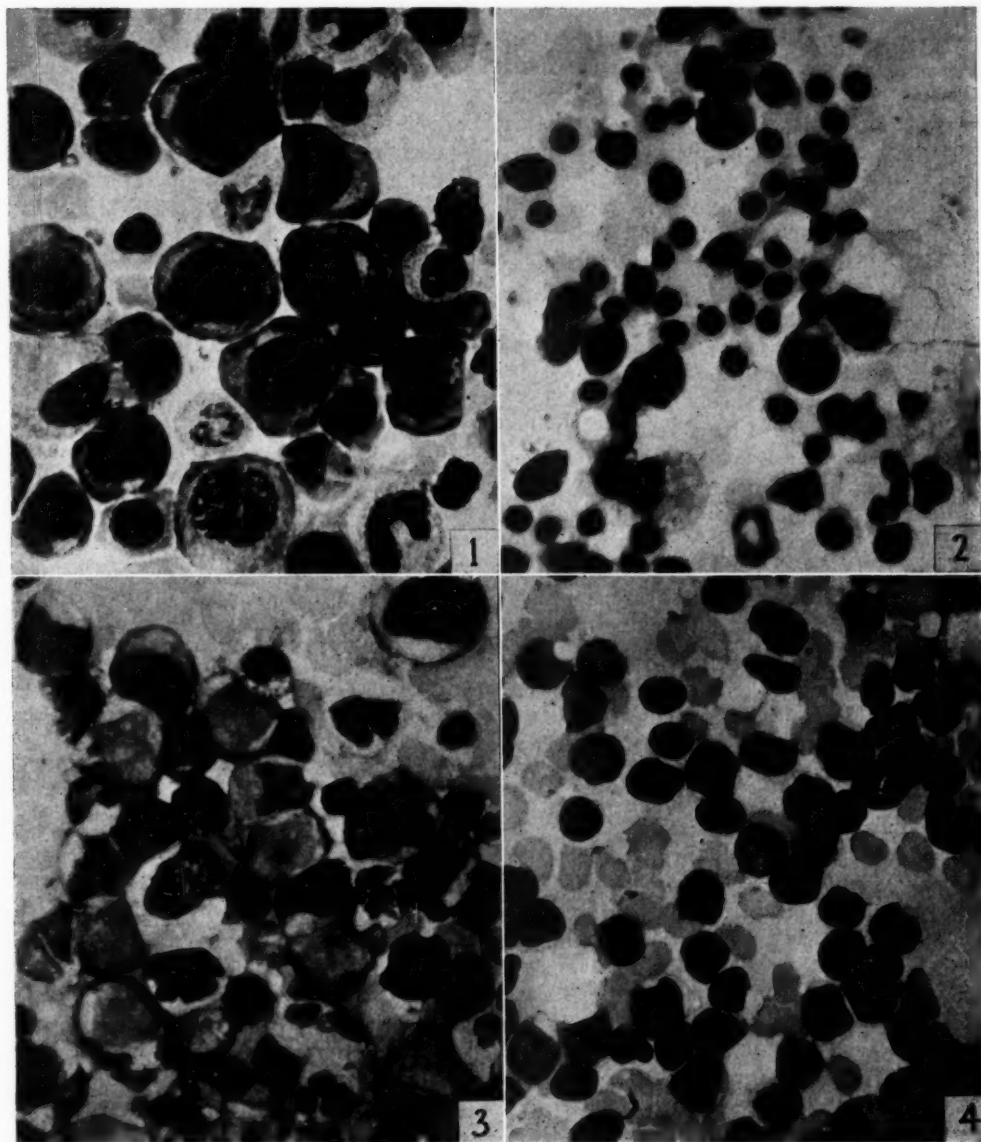
The bone marrow of pernicious anemia in relapse is not only very hyperplastic but is also characterized by abnormal myelopoiesis and erythropoiesis. Normoblastic erythropoiesis is suppressed and largely replaced by megaloblastic erythropoiesis (Fig. 1). These megaloblasts are present in large numbers at various levels of maturation of which basophilic and polychromatophilic forms usually predominate. Megaloblasts are distinctly different from normoblasts and are characterized by a finer nuclear structure, more rapid accumulation of hemoglobin in proportion to the maturity of the cell, and usually by a larger size. The differences are recorded in detail and illustrated by Jones.<sup>14</sup> The marrow also presents immature stages of the characteristic pernicious anemia neutrophils of the peripheral blood (Downey<sup>8</sup>) in the form of large, hyperpolymorphic neutrophilic promyelocytes, myelocytes, and metamyelocytes (Jones<sup>13</sup>).

Under the influence of liver extract the marrow rapidly undergoes profound changes. There is a rapid maturation of megaloblasts, no new megaloblasts are formed, and by the twelfth day only rare polychromatophilic and orthochromatic



megaloblasts may be found (Jones<sup>14</sup>). Coincident with this change there is a normoblastic hy-

maximum reticulocyte response of the peripheral blood but persists until hemoglobin and erythro-



Aspiration biopsies of sternal marrow. May-Grünwald-Giemsa photomicrographs X 1000.

Fig. 1. Pernicious anemia in relapse. Note megaloblasts at various levels of maturation.

Fig. 3. Acute myeloid leukemia. Maturing granulocytes as well as abnormal immature forms are present.

Fig. 2. Macrocytic hemolytic anemia showing normoblastic erythropoiesis.

Fig. 4. Aleukemic lymphatic leukemia. Mature, uniformly small lymphocytes are shown.

perplasia, first characterized by the appearance of large numbers of pronormoblasts and basophilic normoblasts, which reaches its height prior to the

cyte values of the peripheral blood approach normal levels. Pathologic neutrophils also disappear but much more slowly than the megaloblasts.

In many cases of pernicious anemia the diagnosis may be established without resort to sternal biopsy. It is in those cases where the findings are atypical and not entirely diagnostic that biopsy is definitely indicated. The procedure permits a positive diagnosis in true pernicious anemia and eliminates the possibility in other macrocytic anemias. Most cases of pernicious anemia in relapse present a clearly diagnostic marrow. Cases in beginning remission—either spontaneous or induced—offer considerably more difficulty. The rapid disappearance of megaloblasts at the onset of remission has been noted. Under such circumstances exhaustive search may be required to demonstrate their presence. Here the immature forms of the pernicious anemia neutrophil have added significance, for their less rapid disappearance in remission may leave them as the only diagnostic feature of the disease. While the distinction between megaloblast and normoblast may be difficult on the basis of single cells, examination of the several maturation levels presented in the smears makes possible a definite statement as to whether the erythropoiesis observed is normoblastic or megaloblastic. It must be remembered that unusually large normoblasts (macronormoblasts) occur under a variety of circumstances, but that these cells maintain the morphologic features of the normoblast and resemble the megaloblast only in respect to size.

Contrasted with the megaloblastic erythropoiesis of pernicious anemia in relapse is the type of erythropoiesis seen in other anemias. As noted in idiopathic hypochromic anemia (Dameshek,<sup>11</sup> Segerdahl<sup>28</sup>), but equally characteristic of other anemias in which iron deficiency is the common denominator (hypochromic anemias of infancy, pregnancy, chronic blood loss and chlorosis) (Scott<sup>27</sup>), as well as in posthemorrhagic anemias, the macrocytic anemias other than pernicious anemia, and hemolytic anemias, there is a hyperplastic normoblastic marrow with relatively little disturbance, in the absence of infection, of granulopoiesis (Fig. 2). The qualitative features of the normoblasts may vary in these several conditions as may their maturity dispersions and the percentage of the nucleated cells which they comprise. The greatest normoblastic hyperplasia is seen in the hemolytic anemias, as in congenital hemolytic jaundice, where normoblasts may make up over 50 per cent of the nucleated cells (Weiner and Kaznelson,<sup>32</sup> Löwin-

ger<sup>18</sup>). Megaloblasts are never found in these conditions and erythropoiesis proceeds along normal lines.

In aplastic anemias the described changes in the marrow vary with the individual author's concept of the disease. If extreme hypoplasia of the marrow is part of that concept, as expressed by Rosenthal<sup>22</sup> and others, then only such a marrow should be encountered. If the concept is based on clinical grounds a more variable condition of the marrow is found. Thus Rhoads and Miller<sup>20</sup> described marrows ranging from hypoplastic to hyperplastic. The term panmyelophthisis is often used synonymously with aplastic anemia but, as Schulten<sup>25</sup> points out, is best reserved for those cases in which extremely hypocellular marrows are demonstrable.

In acute aplastic anemia extremely hypocellular marrows are usually found. The M-E volume is very low, smears reveal but few myeloid cells and normoblasts, and lymphocytes frequently dominate the picture. Megakaryocytes are absent and there may be a few, commonly phagocytic, reticulo-endothelial cells and plasma cells. The condition of the marrow is well illustrated by the following case:

A white girl, nine years of age, was seen following a two-month period of weakness, persistent low-grade fever, purpuric episodes and a severe progressive anemia which had failed to respond to transfusions or other therapeutic measures. The peripheral blood contained 41 per cent hemoglobin (Sahli) and red and white cells numbered 2,050,000 and 2800 per cu. mm. respectively. The differential count revealed 95 per cent lymphocytes and 5 per cent neutrophils; there were no immature forms and both neutrophils and lymphocytes showed toxic changes. There were no reticulo-cytes. The cuff test was positive, the bleeding and clotting times were 30 minutes and 15 minutes respectively. Bone marrow aspiration was performed on two occasions. In each instance there was a grossly negligible M-E volume. The cells encountered were predominantly lymphocytes, most of which were leukocytoid. There were appreciable numbers of histiocytic reticulo-endothelial cells and a few plasma cells. Megakaryocytes were not found. There were a few polychromatophilic and orthochromatic normoblasts and the myeloid series was represented by rare myelocytes and metamyelocytes. In view of these findings a diagnosis of panmyelophthisis was made. At necropsy, a month after admission to the hospital, the marrow was like that found at the time of biopsy and there was no evidence of leukemia in any of the organs.

Chronic cases may show less disturbance of granulopoiesis, and erythropoietic activity varies.

There may be a distinct shift to the left in the maturity dispersion of the normoblasts, although, as indicated by consistently reduced M-E volumes, the hematopoietic activity is quantitatively suppressed. One case in which several biopsies were performed over a period of many months revealed variable degrees of normoblastic activity. It is probable that disappearance of hematopoietic marrow progresses unevenly in these cases and may account for some of the variations encountered. The activity of sternal marrow is ordinarily considered to be the most persistent of the entire hematopoietic system (Custer and Ahlfeldt<sup>4</sup>), and it may appear active while that of the bulk of the blood forming marrow is more extensively suppressed.

Sternal biopsy is of distinct value in cases presenting the clinical picture of aplastic anemia. The changes in the marrow in symptomatic aplastic anemia which is the result of known toxic agents such as benzol, x-irradiation, prolonged infections and the like, are similar to those of the idiopathic form. The findings are, however, quite different when the anemia is produced by an aleukemic leukemia or a carcinomatosis of the bone marrow. If one encounters a cellular marrow in a clinical aplastic anemia the possibility of a remission is perhaps greater and in this sense may be of some value in predicting the course of the disease.

### Agranulocytosis

In agranulocytosis the myeloid series alone is involved and erythropoiesis is not suppressed. Custer<sup>3</sup> and Fitz-Hugh and Krumbhaar<sup>6</sup> described failure of maturation and proliferation of myeloblasts. Darling, Parker and Jackson<sup>7</sup> described hyperplasia of stem cells and absence of more mature forms in rapidly fatal cases, hypoplasia of myeloid cells coincident with the appearance of many plasma cells and lymphocytes in fatal cases of longer duration, and rapid maturation during the recovery phase of favorable cases. Jaffé<sup>11</sup> emphasized degenerative changes in the myelocytes. Rohr<sup>21a</sup> described three types of marrow in agranulocytosis: (1) Severe cases with complete granulopoietic aplasia accompanied by proliferation of reticular cells (phagocytic, lymphoid and plasma cell types); (2) moderately severe cases with the marrow hyperplastic at promyelocyte-myelocyte levels; (3) mild cases with an essentially normal mar-

row but showing some reduction in metamyelocytes and band forms. Biopsy of the marrow is of some prognostic significance in this disease, for the cases with complete granulocytic aplasia have a less favorable prognosis than do those with cellular marrows.

### Essential Thrombocytopenic Purpura

In essential thrombocytopenic purpura the marrow shows little disturbance of granulopoiesis, and erythropoietic activity varies somewhat with the degree of anemia that may be present. Studies of the marrow in this condition have been particularly concerned with the megakaryocytes. There is a notable increase of these cells according to Jaffé,<sup>12</sup> Rohr,<sup>21b</sup> Limarzi and Schleicher,<sup>17</sup> and others. Pathologic changes, particularly lack of granulation, were described by Frank,<sup>10</sup> Schminke,<sup>24</sup> and others. Markoff<sup>19</sup> considered quantitative estimations to be unreliable and found the same morphologic features in normal marrows as in this disease.

In the very few cases in which we have studied the marrow, the adult forms have not appeared to be more numerous than in many other marrows but young forms were more readily found. Morphological changes were not impressive. The practical value of biopsy in this disease is not significantly influenced by disagreement concerning the morphologic features of the megakaryocytes. Biopsy helps to separate this condition from other diseases, such as acute aplastic anemia and aleukemic leukemia, which may present a similar clinical picture. Wiseman, Doan and Wilson<sup>33</sup> listed biopsy of the marrow as one of the required diagnostic procedures.

### Leukemia

Biopsy of the marrow yields no information of diagnostic importance in cases of leukemia presenting typical clinical and hematological findings. Biopsy is indicated in suspected cases in which positive evidence from other sources is lacking. Many cases present clinical features not unlike those of aplastic anemia, purpura, agranulocytosis, pernicious anemia, et cetera. Aleukemic and subleukemic phases of the disease are not uncommon, and under such circumstances sternal biopsy may immediately provide a diagnosis which would otherwise require an extended period of observation.

Chronic myeloid leukemia with a peripheral leukocytosis presents a myeloid hyperplasia with a maturity dispersion more or less approximating that of the peripheral blood (Segerdahl,<sup>28</sup> von Jagic and Klima,<sup>31</sup> Scott<sup>27</sup> and others). Thus, although there is commonly a significantly elevated M-E volume, there may be no significant deviation from the normal maturity dispersion. The diagnosis in an aleukemic state is consequently difficult. Schulten<sup>25</sup> and Barta<sup>2</sup> emphasized the similarity of these marrows to those observed in certain chronic infections. Many toxic-infectious states are accompanied by myeloid hyperplasia with variable degrees of shift to immaturity. Thus such a marrow might be predominantly myelocytic or myelocytic-promyelocytic and indistinguishable from that of a leukemic marrow presenting a preponderance of cells at the same levels of maturation. The fact that infections are frequently accompanied by increased numbers of reticulum cells and plasma cells as well as toxic changes in the leukocytes, features usually absent or less prominent in leukemia, is of aid in differentiation (von Jagic and Klima<sup>31</sup>).

In most cases of acute myeloid leukemia there is a great preponderance of immature forms—myeloblasts (Segerdahl,<sup>28</sup> Schulten,<sup>25</sup> Dame-shak<sup>6</sup>). Schartum-Hansen,<sup>28</sup> Scott<sup>27</sup> and others emphasize the frequent abnormal morphological features of these immature leukemic cells. These forms are the paramyeloblasts of Naegeli, micromyeloblasts, monocytoïd myeloblasts, etc. Such a marrow is clearly diagnostic irrespective of the blood picture. Klima<sup>31</sup> described three types of marrow in acute myeloid leukemia: (1) hyperplastic with about 90 per cent of the cells at myeloblast level; (2) hypoplastic but with a similar proportion of stem cells; (3) hyperplastic but with variable degrees of immaturity (Fig. 3). Cases in the third group are not rare and offer considerable difficulty in diagnosis. These marrows are again not unlike the hyperplastic reactions to infections. Barta,<sup>2</sup> for example, described marrows with high proportions of stem cells in specific infections accompanied by severe leukopenia. We have observed several cases in which it was extremely difficult to determine whether the findings represented a reaction to an infection, symptoms of which these patients so frequently exhibit, or a leukemia. In one case, with the clinical features of sepsis, in

which repeated examinations of the blood revealed only rare immature cells, the marrow showed but little shift in the maturity dispersion and the immature forms were not sufficiently abnormal to be considered diagnostic. The importance of the qualitative features is illustrated by the following case:

A white female infant, five months of age, was admitted to the hospital one month after the onset of a persistent upper respiratory infection and ten days after the appearance of a swelling behind the right ear. The pertinent findings were: moderate pallor, temperature of 101.4°, fluctuant postauricular mass, thick, reddened right tympanic membrane, and palpable liver and spleen. In the peripheral blood the hemoglobin was 52 per cent (Sahli) and red and white cells numbered 2,800,000 and 14,100 per cu. mm. respectively. The post-auricular subperiosteal abscess was drained and a right myringotomy was performed. The hemoglobin rose to 90 per cent following transfusions. Postauricular drainage persisted for a time but the wound finally healed and the fever temporarily disappeared.

At the time of admission the differential count on the peripheral blood revealed 50 per cent lymphocytes, 20 per cent neutrophils and 30 per cent monocytes. Both neutrophils and lymphocytes showed toxic changes. The monocytes were mature although some were atypical. Whether the picture presented was one of a monocytic response to an infection or a monocytic leukemia was uncertain. Aspiration biopsy on the tenth hospital day yielded a cellular sternal marrow with a myeloid maturity dispersion which, although shifted to the left, was not quantitatively significant. There were, however, numbers of abnormal monocytoïd myeloblasts. These cells were of variable size, had variable amounts of cytoplasm both with and without azure granulation, and had abnormally lobulated nuclei. Mature monocytes were not found. Toxic-infectious features such as increased numbers of plasma cells and histiocytes were absent. It was believed that although the marrow could hardly be said to present irrefutable evidence of leukemia, the abnormal immature forms, together with the peripheral monocytosis and splenomegaly, justified a diagnosis of monocytic leukemia (Naegeli type). At necropsy, ten weeks after admission to the hospital, the typical findings of myeloid leukemia were presented.

It is evident that the findings in both acute and chronic myeloid leukemia are extremely variable. While the diagnosis in the presence of pronounced changes is readily made, the dividing line between a leukemic and a "reactive" marrow is by no means sharply drawn. Attention to the qualitative features, such as abnormality of the cells, toxic changes, et cetera, is



helpful, but the findings are frequently subject to interpretation, may be justifiably interpreted only in connection with the clinical features, and it may even then be impossible to make a positive diagnosis.

The typical case of lymphatic leukemia with a high peripheral lymphocytosis yields a marrow in which about 90 per cent of the cells are lymphocytes (Segerdahl,<sup>28</sup> Klima<sup>15</sup>). It has been pointed out that under such circumstances it is impossible to determine the proportion of lymphocytes derived from the marrow and diluting sinusoidal blood respectively. When the peripheral blood contains from 10,000 to 20,000 cells per cu. mm. the marrow usually shows from 30 per cent to 50 per cent lymphocytes (Rohr,<sup>21</sup> Klima<sup>15</sup>). Yet in this group as well as in cases without elevated peripheral counts the degree of lymphocytosis of the marrow varies greatly. Scott<sup>27</sup> found from 7 per cent to 97 per cent lymphocytes in cases presenting low to moderately elevated peripheral counts.

Probably most cases will present a sufficiently high proportion of lymphocytes to be considered diagnostic. In these instances the procedure is an easy means of establishing or confirming a diagnosis as illustrated by the following case:

A white woman fifty-one years of age, gave a history of gradually progressive weakness of a year's duration and severe headaches during the last three months of this period. The only significant physical finding, in addition to marked pallor, was the presence of palpable posterior cervical, axillary and inguinal nodes. The hemoglobin was 20 per cent (Sahli); red cells and white cells numbered 990,000 and 4,500 per cu. mm. of blood respectively. There were 70 per cent of lymphocytes and 30 per cent neutrophils by differential count; there were no immature forms and the neutrophils presented a moderate toxic granulation.

Sternal aspiration yielded a cellular marrow completely overrun with uniformly small mature lymphocytes (Fig. 4). This finding, together with the data previously presented, entirely justified a diagnosis of aleukemic lymphatic leukemia.

Cases without significant lymphocytosis in the marrow do occur and a diagnosis on the basis of a sternal biopsy may be impossible. Such instances have been reported by Weiner and Kaznelson,<sup>32</sup> Klima<sup>15</sup> and others. In one of our cases of aleukemic lymphatic leukemia, proven at autopsy, three biopsies of the sternal marrow failed to reveal evidence of the disease.

The degree of lymphocytosis necessary for a positive diagnosis is subject to interpretation. Scott<sup>27</sup> considered 40 per cent lymphocytes diagnostic. It has been noted above that reported normal counts range up to 24 per cent, although few are above 12 per cent. Although a large percentage is necessary for an arbitrary diagnosis, a less marked but elevated lymphocyte count must be viewed with suspicion, and in conjunction with the clinical and other hematological data may at times justify a diagnosis. The differential count alone is of little significance. Scott reported up to 80 per cent lymphocytes in cases of aplastic anemia and the case cited above under that topic is similar. In such instances, however, the lymphocytosis is relative, for the marrow is extremely hypocellular. In the absence of a demonstrable cellular marrow indicated either by large numbers of cells in direct smears or a reasonable M-E volume, a diagnosis of lymphatic leukemia must be made with caution. The qualitative features are also of importance. Small numbers of immature lymphocytes are of greater significance than an equivalent proportion of mature forms. Chronic cases present the same monotonous uniformity of the cells as is exhibited in the peripheral blood. Toxic changes, as noted under myeloid leukemia, are usually absent. Irregular involvement of the marrow undoubtedly accounts for failure to demonstrate the disease in some instances, and when a biopsy in a suspected case gives negative results, repetition of the procedure at a different sternal level may be worth while.

### Summary

Sternal biopsy is a useful procedure in the diagnosis of diseases of the hematopoietic system. While in many instances biopsy is unnecessary and can add no information of diagnostic importance, it may be very helpful in obscure cases. The indications can hardly be arbitrarily defined, but biopsy may be considered advisable in any case where a disease of the hematopoietic system is present or suspected and the evidence from other sources does not permit a diagnosis. Biopsy is particularly advisable in obscure anemias, suspected leukemias, thrombocytopenic purpura and agranulocytosis. The findings may or may not be conclusive, are frequently subject to interpretation, and the procedure can by no means be considered to give the final answer to

all hematological problems. An appreciation of its limitations increases the value of sternal biopsy as a diagnostic aid.

NOTE: Thanks are due Dr. C. J. Watson and Dr. Irvine McQuarrie of the Departments of Medicine and Pediatrics respectively, of the University of Minnesota Hospitals, for permission to use the clinical data in the cases reported here.

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# PNEUMONIA IN DULUTH DURING 1939-1940\*

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THE mortality from pneumonia is decreasing. The factors responsible for this are not definitely known. Is the widespread use of sulfapyridine responsible? Is the disease changing its form due to alterations in the virulence of the organisms or to increased resistance in the host? Other infectious diseases are also showing lower mortality rates, and one wonders how much is due to improvement in diet, sanitation, housing, etc. Reimann<sup>5</sup> discusses this question but is unable to come to a definite conclusion as to the relative importance of any one of these factors. Chemotherapy, however, must be considered a major determinant.

\*From the Department of Internal Medicine, The Duluth Clinic. Presented before the Interurban Academy of Medicine, May 15, 1940.  
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In order to study the current form of pneumonia and its response to therapy, particularly chemotherapy, a hundred unselected cases occurring in Duluth hospitals† during the 1939-1940 season were reviewed. The clinical records and x-rays were examined so that only those with definite infiltration or consolidation were included. Complicating pneumonias such as post-operative or hypostatic were excluded. The salient features brought out by this study will be presented.

## Clinical Features

The monthly incidence was not unexpected, the greatest number of cases occurring during the months of March and April.

The symptoms of the present illness could

be dated back to an upper respiratory infection in 60 per cent of the cases. In half of these it extended back as far as two weeks. While the individual was suffering from such symptoms as malaise, cough, slight fever, etc., there would suddenly occur a chill with pain in the chest and the actual onset of the pneumonia take place. In 30 per cent of the cases the onset was precipitate without antecedent symptoms of upper respiratory infection.

The appearance of the patients at the bedside was not striking. They usually did not appear profoundly ill and stertorous breathing with marked prostration and dyspnea were uncommon. Abdominal distention was also seen rarely.

Practically all types of pneumococci were encountered in the sputum. Fifty-one per cent had a positive pneumococcus typing, 23 per cent had a negative typing reaction, and 26 per cent were not typed. Of those having a positive reaction, 70 per cent had pneumococci of the "lower types" (I, II, III, VII, and VIII). In view of the 23 per cent who had a negative typing reaction it is probable that some cases are included in this series which are not due to the pneumococcus but to some other organism or virus.

### Pathology

The classic pathology of pneumonia consisting of congestion, infiltration, consolidation and resolution is well known. Experimental lobar pneumonia has been produced and the pathogenesis elucidated. The organisms penetrate the bronchial wall and invade the peribronchial lymphatics. Congestion and edema of the peribronchial tissues occurs and the organisms travel peripherally by the peribronchial route until they reach the alveoli. Finally when the organisms lodge in the alveoli a fibrinous exudate is formed and the familiar changes of consolidation are produced. It is seen then that the initial infection begins centrally and spreads out by infiltration. When this spread goes into a single lobe of the lung and the entire lobe becomes eventually involved we have the typical picture of lobar pneumonia. However, if only part of a lobe is involved or if parts of several lobes are involved, the distribution is lobular and the term, lobar, if strictly applied, is incorrect. In the cases studied, all these pathological variations were observed either at autopsy or by radiograph.

The distribution of the lesions was widespread

in some cases and so minimal in others that they could scarcely be seen. A single focus of pneumonia was observed in fifty-six cases, two foci in twenty-seven, three foci in eight, four foci in one case and six foci in 1 case. No radiographs were taken in seven cases. So-called migratory pneumonia was seen in three instances. In one of these there was a fatal termination.

Complications were very uncommon and when they did occur were extremely mild. Small effusions were present in five instances. There was one empyema. This was easily treated by repeated aspiration and recovery was uneventful.

### Therapy

The treatment of each case was recorded. This was made easy by the fact that 90 per cent of the cases were routinely treated with sulfapyridine, alone, or with the addition of serum, oxygen, x-ray or diathermy. A few were treated with sulfanilamide, neoprontosil and sulphathiazole. The effect on the temperature curve was used as an indicator of the potency of the treatment. Because of the low mortality rate and the relatively small number of cases studied, it was felt that the mortality rate would not be an accurate criterion. No serious or fatal toxic reactions occurred.

*Sulfapyridine.*—The drug was used in 90 per cent of the cases. It was either used alone or in combination with serum, oxygen, diathermy or x-ray. No essential difference in results was noted whether used alone or in combination. In 75 per cent of cases there was a prompt drop in temperature to normal in one and one-half to two days. In the 25 per cent in which this did not occur the drug was either given in insufficient dosage, the extent of the involvement was very great, or the patient was admitted in a terminal state.

The usual dosage was 2 grams stat. with 2 grams repeated in four hours and 1 gram every four hours thereafter. This was continued until the temperature was normal. At this time the drug was usually stopped and there would result a rebound of the fever with a delayed return to normal. In many instances, especially in those where the fever failed to return to normal promptly, a lower dosage such as .65 grams every four hours or 1 gram every four hours was prescribed. This is considered insufficient dosage by

most authorities. It would appear that the optimal dosage is 2 grams stat. and 2 grams in four hours with 1 gram every four hours thereafter. When the temperature reaches normal, the amount should be decreased to 0.5 gram every four hours, later to 0.5 gram every six hours and finally discontinued. With this method toxic reactions are minimal and no rebound of temperature occurs. Higher dosage is always associated with more reactions and results which are no better.<sup>1</sup> In many cases a smaller dosage will be effective. As with all drug therapy it is probably unwise to adhere rigidly to one definite system of dosage but one should in general give "enough." It is probably safest to drive the temperature to normal as soon as possible and keep it there if this can be accomplished without undesirable reactions. As has already been mentioned, there is a tendency for the pneumonia to become migratory in some instances. The prompt administration of enough of the drug to quickly drive the temperature to normal might prevent this.

*Sulphathiazole, neoprontosil and sulfanilamide* were used in a few cases but the number was so small that no conclusions could be drawn. Oxygen was administered in only eighteen cases, and always with other therapy. This may be an indication of the relatively mild form of the disease present. Diathermy and x-ray were used in eleven instances. They were never used alone but only when other agents failed to bring a rapid favorable response.

*Serum*—This therapy was used in only eight cases and in these sulfapyridine was also given. There were four cases of Type I, three cases of Type III and one case of Type II. The results of the combined therapy seemed no different from those where sulfapyridine alone was used. It was often noted that by the time the sputum had been typed, serum ordered and sensitivity tests made, the temperature had already fallen to normal because of the sulfapyridine which had been given immediately on admission. Finland<sup>8</sup> recommends the use of serum combined with sulfapyridine and there is experimental work to show the superiority of this over sulfapyridine alone. However, Dowling<sup>2</sup> in a series of 220 cases found a lower mortality when sulfapyridine was used (11 per cent) than when serum alone was used (16.7 per cent). Finland had

a mortality rate of 13 per cent for patients treated with serum alone and 15 per cent for those treated with sulfapyridine alone. In the cases that received early treatment Dowling noted a mortality of 10.8 per cent when serum was used and 2.9 per cent when sulfapyridine was used. It is seen that the figures for each type of therapy are almost the same. The good practical results seen with sulfapyridine combined with the inexpensiveness and ease of administration seem to warrant its further routine use.

### Mortality

There were five deaths encountered in the hundred patients studied. When one considers the fact that these patients were from all walks of life, both urban and rural, and that they were treated by various doctors in different hospitals, this mortality rate is admirably low. It is also noteworthy that there were no deaths in uncomplicated cases, which were seen early. A brief description of the fatal cases follows:

*Case 1.*—An eighty-two-year-old male was admitted in a semi-stuporous and delirious condition. Prontosil and sulfapyridine were administered with some difficulty. He died seven days after entering the hospital. The sputum was not typed. Autopsy showed bronchopneumonia in the left upper, right upper and right lower lobes, and a recent embolism in the right lower pulmonary artery. This might be looked upon as a terminal bronchopneumonia but no other disease complicated the picture, except possibly senility.

*Case 2.*—This patient, a sixty-year-old male, was in extremis on admission and died about twelve hours later. He had a positive Kolmer and Kline blood reaction. No autopsy was obtained.

*Case 3.*—This patient had a migratory pneumonia. *Mococcus* was recovered from the sputum. There was an old history of pernicious anemia but no anemia was present at this time. She was treated with varying doses of sulfanilamide, neoprontosil and sulfapyridine. After many febrile recurrences she finally began to improve. This was interrupted by a final rise in temperature with heart failure and death. The autopsy showed a right empyema, a large infarct in the right lower lobe, and an organizing bronchopneumonia throughout various parts of both lungs.

*Case 4.*—This patient, aged seventy-seven, was admitted in coma. He had in addition to pneumonia, uremia and uncontrolled diabetes. An autopsy showed a bronchopneumonic consolidation in the right and left lower lobes. There was no kidney pathology.

*Case 5.*—This sixty-year-old male was admitted in a stuporous condition. He had had asthma for many years and had been a heavy drinker. His pneumonia was Type II. Heavy sulfanilamide and serum therapy were given but he died in two days. The autopsy showed consolidation of the right lower lobe, fatty



vacuolization of the liver, grade III and thickening of the basement membrane of the bronchioles.

It is seen that the deaths, at least four of them, might be due to the poor condition of the patient at the time of admission to the hospital. Complicating conditions such as fatty liver, uremia, diabetes, cerebral arteriosclerosis were also factors in the mortality.

### Comment

The pneumonia seen in Duluth during the past winter has been of a comparatively mild type. The generally favorable course and mild symptoms in many of our cases suggests the possibility that we are dealing with a different type of disease than that seen formerly or from that seen in metropolitan areas. Murray<sup>4</sup> in Boston has recently described an atypical bronchopneumonia which has some features in common with our cases. He noted that in about 50 per cent there was an onset with symptoms of "flu" or "cold" and about one-fourth had a sudden recent onset. The physical findings in the chest were minimal. Sputum was scanty. There was no tympanites. This syndrome was also seen in many of our patients. A comparison of the x-ray findings also shows some similarities. He noted a lobular distribution with most involvement in the lower lobes but the upper middle and hilar areas were also affected. This we have seen. However, bilateral lesions were only observed in 10 per cent and in our cases they were present in 30 per cent. He found varying numbers of one or more types of pneumococcus but practically none of the "lower types." Seventy per cent of our cases with positive sputum had pneumococci of the "lower types." It would appear that the atypical bronchopneumonia or acute interstitial pneumonia described by Murray and others is not exactly similar to that seen in this locality but some of our cases correspond.

Dowling in Washington, D. C., reported on 232 cases of pneumonia in the 1938-39 season. Of ninety-six patients treated with serum alone

there was a mortality rate of 16.7 per cent. Of 136 patients treated with sulfapyridine alone there was a mortality rate of 11 per cent. This includes all cases early and late. Apparently sulfapyridine has a slight lead over serum in therapeutic effectiveness. If only those patients who were treated early are included the figures are 10.8 for the serum-treated and 2.9 for those receiving sulfapyridine. This early treated group probably compares with the type of case observed in our Duluth hospitals. Therefore our mortality is roughly comparable. In the larger cities more late cases are admitted to the hospitals and therefore their mortality rates tend to be greater.

### Conclusions

1. One hundred cases of pneumonia appearing in Duluth during the 1939-40 season were analyzed.
2. The disease was of a comparatively mild nature with few complications. The most prominent feature was the tendency for the pulmonary involvement to be of a lobular character, multiple foci being present in nearly half the cases.
3. Sulfapyridine was used in 90 per cent of the cases. As a rule a prompt fall in temperature occurred. When this was not the case insufficient dosage of the drug was usually responsible.
4. There was a mortality rate of 5 per cent.

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### HYPOTHYROIDISM IN CHILDREN

Physicians often have difficulty in diagnosing hypothyroidism in children. One of the commonest errors is to think that mongolian idiots are cretins. Many times mongolian idiots referred by practicing physicians to children's clinics arrive with the diagnosis of cretinism. Mentally defective children are often considered to be cretins, solely because of their retarded mental development and particularly if they happen to have a puzzled expression and queer physiognomy. Dwarfism, even if not accompanied by any of the stigmas of hypothyroidism, is often thought to depend on deficiency of the thyroid, probably because hypothyroidism is so well known as a cause of dwarfism. An error which has become common recently is to consider delay in the development of the centers of ossification of the epiphyses as being due to hypothyroidism. This is the outgrowth of the mistaken idea that the thyroid alone governs the maturation of the centers of ossification of the skeleton. The principal difficulty is that the physician is inclined to base the diagnosis of deficiency of thyroid on the finding of one or two suggestive signs. The paper of Wilkins and Fleischmann which appears in this issue of *The Journal* is timely. It indicates the necessity of considering the entire clinical picture from the point of view of both functional and structural changes. Attention is drawn also to the fact that the character and extent of structural changes depend on the time of life when the deficiency occurs and the length of time it remains untreated.—*Jour. A.M.A.*, May 31, 1941.

## AN ATTEMPT TO PREVENT POSTOPERATIVE PNEUMONIA WITH A RESPIRATORY VACCINE\*

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NUMEROUS measures to reduce surgical risk in intestinal operations have been developed through the years. One of these efforts has been an attempt to prevent infections of the upper part of the respiratory tract. With the advent of cold weather, vaccines of streptococci and pneumococci were administered for several days to a week before undertaking such operations. During the years of this method of treatment singularly few instances of postoperative pneumonia occurred on the intestinal service.

However, in the summer of 1937 postoperative pneumonia developed in several cases while the patients were in a hospital under exceptionally well-controlled circumstances. It had been concluded by various investigators that immunity could be produced in human beings and animals with vaccines prepared from heat-killed streptococci and pneumococci.<sup>1,2,3,7</sup> These investigators felt that protection had been afforded to persons against epidemic infections of the respiratory tract and to animals against inoculation of streptococci isolated in these diseases by the use of composite, relatively nontoxic vaccines prepared with the streptococci and pneumococci concerned. The cataphoretic velocity and pneumotropic virulence of streptococci isolated in studies of the common cold, of influenza and of simple and influenzal bronchopneumonia, as studied by Rosenow, are characteristic and much alike in different seasonal epidemics.<sup>4,5,6</sup> It had been thought that a vaccine prepared from these organisms might afford protection against postoperative pneumonia.

For this reason such a vaccine was administered to patients on whom intestinal operations were to be performed. The patients who were to have such operations received pre-operative preparation on the combined colon service in the hospital for several days. It seemed, therefore, that an ex-

cellent opportunity to establish the value of a respiratory vaccine was at hand. A minimum of three pre-operative days to administer the vaccine to the patients was available. The vaccine used was prepared by Dr. E. C. Rosenow from strains of streptococci and pneumococci which had been isolated from patients having acute infections of the respiratory tract, chiefly the autumnal cold and influenza. The vaccine was made to contain 2,000,000,000 heat-killed (70°C., one hour) organisms per cubic centimeter of many freshly isolated strains that had been preserved for some time in dense suspension of glycerol (two parts) and 25 per cent salt solution (one part). Three-tenths cubic centimeter of the vaccine was injected subcutaneously two days before operation, 0.5 c.c. the day before and 1.0 c.c. the day of operation. There was only slight local reaction and no untoward constitutional reaction. The cases were studied postoperatively and the necessary clinical, roentgenologic and special studies were carried out to determine the presence of frank pneumonia.

Because of the variety of intestinal conditions and operative procedures, it was decided that alternate patients should receive the vaccine. This was done by arranging the list of cases scheduled for operation three days hence in numerical order beginning with the smallest clinic registration number. Whether or not the first patient on the list for a given day received vaccine depended on the last patient on the list of the day before. Analysis confirmed the randomness of this sample.

Table I shows the incidence of postoperative pneumonia among patients who had received vaccine and among those who had not received it. Under the conditions of observation as outlined the vaccine did not seem to lower the incidence of frank postoperative pneumonia. We therefore decided to study the characteristics of the group of cases with respect to age, sex and other pertinent factors.

\*Work done on Intestinal Service, St. Mary's Hospital, Rochester, Minnesota. From the Mayo Foundation (Tennison, Fellow in Surgery) and the Division of Medicine, The Mayo Clinic (Bargen and Wood).

# POSTOPERATIVE PNEUMONIA—TENNISON, ET AL.

TABLE I. INCIDENCE OF POSTOPERATIVE PNEUMONIA AMONG PATIENTS WHO HAD RECEIVED VACCINE AND AMONG THOSE WHO HAD NOT RECEIVED IT.

Group	Total cases	Pneumonia cases	Per cent
Vaccine	307	10	3.3
No vaccine	297	6	2.0
Total	604	16	2.6

Table II shows that the "apparently poor" results of giving vaccine occurred chiefly among men. We feel that the result is not significant as only eight cases of pneumonia were involved.

We measured the "vaccine" and "no vaccine" groups separately for the succeeding tables. As there was no difference, we combined the two groups to gain size for the analysis with respect to age, past history of pneumonia and weight of patient.

TABLE II. INCIDENCE OF POSTOPERATIVE PNEUMONIA ACCORDING TO SEX OF PATIENT.

Group	Total cases	Pneumonia cases	Per cent
MEN			
Vaccine	173	6	3.5
No vaccine	161	2	1.2
Total	334	8	2.4
WOMEN			
Vaccine	134	4	3.0
No vaccine	136	4	2.9
Total	270	8	3.0

Only one case of pneumonia occurred among 224 patients less than fifty years of age, an incidence of 0.45 per cent. This case of pneumonia occurred in a patient who was forty-nine years old. Fifteen cases occurred among 380 patients fifty years of age and older, an incidence of 3.9 per cent. This strongly suggests that age is a large factor in the incidence of frank postoperative pneumonia.

A past history of pneumonia was given by eighty-four patients, one of whom contracted pneumonia postoperatively, an incidence of 1.2 per cent. Five hundred and twenty patients gave

TABLE III. INCIDENCE OF POSTOPERATIVE PNEUMONIA ACCORDING TO WEIGHT OF PATIENT.

Weight group, lbs.	Total cases	Pneumonia cases	Per cent
Less than 100	17	0	0.0
100-109	39	2	5.1
110-119	65	1	1.5
120-129	87	1	1.1
130-139	93	2	2.2
140-149	82	3	3.7
150-159	63	1	1.6
160-169	46	1	2.2
170-179	42	2	4.8
180-189	35	2	5.7
190-199	12	1	8.3
200 and more	23	0	0.0
Total	604	16	2.6

no past history of pneumonia; fifteen of these contracted pneumonia, an incidence of 2.9 per cent. This suggests that a history of pneumonia does not increase the risk of postoperative pneumonia.

We studied the influence of the weight factor in postoperative pneumonia. Table 3 shows that the patients with higher weights do tend to have slightly higher incidence of pneumonia. However, correlation of age and weight shows that the older age groups are heavier than the younger groups. It would not seem that weight is as great a factor in the incidence of postoperative pneumonia as age.

An analysis of the cases on a time basis revealed two clusters of cases. One centered in October, 1937, and the other to a lesser degree from November, 1938, through February, 1939. We could find no correlation of the cases with personnel either pre-operatively, in the operating room, or postoperatively. Consecutive cases occurred in different wings of the hospital. No common source of the epidemics could be determined except that infections of the respiratory tract were unusually common at the time.

## Conclusions

1. Respiratory vaccine administered pre-operatively under the conditions outlined and during the period in which two epidemics occurred did

not seem to reduce the incidence of frank postoperative pneumonia. In consideration of the results obtained by Rosenow and Heilman in the prevention of infection of the respiratory tract in persons not operated on and in animals, with the same vaccines as used in this study, several factors for consideration arise. The period of inoculation before operation may have been too short. Pneumonia developed in a very small number of cases. A negative report of this type does not deny the value of vaccine in the preventive treatment of infections of the upper part of the respiratory tract. Whether or not vaccine affected the severity of the pneumonia is difficult to ascertain.

2. Sex and weight are only slightly, if at all, associated with the incidence of postoperative pneumonia.

3. A history of pneumonia does not appear to increase the risk of postoperative pneumonia.

4. Age has a bearing on the postoperative incidence of pneumonia.

5. The cases occurred in groups, simulating an epidemic pattern. No evidence concerning the mechanism or source of the epidemic could be obtained.

The study strongly suggests that postoperative pneumonia may be seasonal. A careful study prolonged over a period of years might reveal the epidemic character more clearly and point out obscurely related factors. The data at hand do not in any sense deny the value of vaccine in the preventive treatment of infections of the upper part of the respiratory tract; they concern themselves only with the development of frank pneumonia after operation.

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## BURBOT LIVER OIL IN THE TREATMENT OF VARIOUS DERMATOSES\*

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SINCE the work of Löhr<sup>3,4</sup> many investigators have studied the healing effect of cod liver oil. Its action is unknown but is thought to be related to the presence of vitamins A and D. The oil of the fresh water fish, the burbot (*Lota maculata*) has a high content of vitamins A and D.<sup>1,2,5,6,7</sup> This fish is found in the United States, especially in the Great Lakes and in the Lake of the Woods.<sup>7</sup> As the potency of vitamins in Burbot Liver Oil (N.N.R.) is at least seven times as great as the standard U.S.P. cod liver oil, it was decided to use this oil in the treatment of various dermatoses.

An ointment† was used containing 80 per cent

of burbot liver oil. This concentration of fish liver oil is greater than that of the average cod liver oil ointment. It was used in the treatment of varicose ulcers, *echthyma vulgaris*, indolent ulcers following surgical procedures and psoriasis.

### Varicose Ulcers

Because of the widely variable factors in the course of varicose ulcers, i.e. circulatory status and the local conditions of the tissue, making each case an individual problem, it was decided that a small number of carefully observed cases would be of more value than a large number of cases seen at infrequent intervals. Therefore, ten patients were admitted to the hospital, placed at rest in bed, the affected extremity elevated and the ointment applied to the lesion.

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†The ointment was supplied by the Burbot Liver Products Company, Baudette, Minnesota.



The improvement in each of these ulcers was carefully measured and the patients remained in bed until the ulcers healed. An attempt was made to plot a graph to show the progress of healing, but even with such standard conditions the individual differences were so great that each ulcer was a separate problem.

These patients ranged in age from fifty to seventy-one years and had suffered from recurrent stasis ulcers for ten to forty-seven years. They had been treated by various measures in the Out Patient Departments of the Minneapolis General Hospital and the University of Minnesota Hospitals for a period of at least four months but had not improved.

In view of the great individual differences in these cases it is difficult to evaluate accurately the results of therapy but it can be said that all of the patients improved rapidly with the use of this ointment.

Several of these patients showed remarkable progress.

*Case 1.*—B. W., aged fifty, a Chinese man, suffered from an eruption of the lower legs for ten years. During this time the skin of the left leg was ulcerated at various times and in spite of treatment two large ulcers had been present for five years. He was admitted to the Dermatology Service of the Minneapolis General Hospital on November 15, 1939.

On the left leg just above the ankle were two large ulcers. The upper one on the external surface of the leg was 9x6.5 cm. The lower ulcer was just above the medial side of the ankle and was 8x5.5 cm. The circumference of the leg just above the ankle was 20.3 cm. The depth of each of these ulcers was about 0.4 cm.

These ulcers had healed forty-seven days after the ointment was applied to the lesions.

*Case 2.*—G. P., aged sixty-three, a white man, was admitted to the Dermatology Service of the University of Minnesota Hospitals with varicose ulcers just above the medial aspect of both ankles which had been present for twenty years. He had been treated for several months in the Out Patient Department but the lesions did not heal.

The ulcer on the left leg was 3.3x3.7 cm. and that on the right leg, 3.3x3.8 cm. Burbot liver oil ointment was applied on February 3, 1940. On February 16, the ulcer of the left leg was completely healed and on February 27, both ulcers had healed.

The smallest of the ulcers treated were those described in the second case. The largest ulcer in the series was 10x5.5 cm. The average time of healing of these ulcers was thirty-eight and one-half days.

In addition twenty-three cases of varicose ulcer were treated with the ointment in the Out Patient Department.† An accurate evaluation of therapy

is difficult under these conditions and other measures were used to improve the circulation, but all of these patients improved while using the ointment.

As is found commonly in the treatment of varicose ulcers some of the patients suffered an exacerbation of the dermatitis at the border of the ulcer where the ointment came in contact with the skin. This, however, quickly healed when the application was limited to the ulcerated area. Four of the thirty-three patients developed this dermatitis.

### Other Dermatoses

Other dermatoses were treated with this ointment. Six patients with severe *eczthyma vulgaris* of the lower extremities were admitted to the hospital and treated, and one patient with this condition received treatment in the Out Patient Department. All of these ulcers healed rapidly.

Four patients with psoriasis were treated. Two of these improved but later relapsed.

The ointment was also used to stimulate healing in three patients with ulcers following surgical procedures. These ulcers had been slow in healing but following the application of the ointment improvement was rapid and they healed quickly.

### Summary

Forty-seven patients with various conditions of the skin were treated with an ointment containing 80 per cent of burbot liver oil.

Satisfactory results were obtained in the treatment of ulcers of the skin.

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†Nineteen of these patients were treated in the Surgery Out-Patient Department of the Minneapolis General Hospital, Arnold Zierold, M.D., Chief.

## COLOCENTESIS—A GLIMPSE OF THE SURGICAL PAST\*

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**C**OLOGENTESIS, or deliberate puncture of the colon, is a procedure frequently employed in veterinary surgery to relieve cattle suffering from "sweet clover bloat," a form of tympanic distention engendered by overindulgence in rich vegetable food. Animals in this condition are so inflated with gas, generated by fermentation occurring within the alimentary canal, that they become unable to stand, topple over and lie helpless on the ground, to die if prompt aid is not at hand. In these circumstances professional veterinarians recommend the insertion of a trocar through the gap between the last rib and the ilium on the left side to allow the gas to escape, but the practical farmer often achieves the same end by performing the operation with no more elaborate instrument than his pocketknife. In either case, the result is dramatic; gas issues from the wound in large quantities, the distended abdomen wilts and slowly returns to normal proportions and the animal is able to rise to its feet and resume its usual activities as if nothing untoward had happened. There are no unwelcome after-effects and cases have been recorded where particularly gluttonous calves have been punctured as many as twelve or fourteen times without mishap.

An onlooker could not fail to be impressed by this spectacular sequence of events wherein a seemingly moribund animal is restored to its pristine health, in a matter of seconds, by a relatively simple procedure, and it is not surprising that Clifford Allbutt<sup>1</sup> should have retained vivid memories of it from boyhood days spent in the country, and in later years have come to consider the possibility of employing a similar method for the relief of human suffering. The opportunity arose in 1869 when he was called in consultation by his colleague, Mr. Bradley, in the case of a laborer who had been admitted to the Leeds Infirmary as suffering from "obstruction of the bowels." His examination revealed that, although the bowel symptoms were the more prominent, they were caused by a reflex paralysis secondary to bilateral lobar pneumonia. The customary therapeutic measures, subcutaneous injections of

morphine, and large enemas both with, and without, turpentine and castor oil had failed to give relief. The distended abdomen caused intense anguish, the extremities were cold, the pulse was small and quick, and the expression anxious. No feces had passed from the bowel for at least five days and no flatus for two.

Allbutt prescribed an injection of a quart or more of warm gruel to be administered slowly through a long tube and followed by an injection of half a pint of warm olive oil, in the hope that the oil might rise through the gruel and reach the obstruction. Belladonna liniment was also to be applied externally to the abdomen and the injections of morphine were to be continued. Although the liniment did have some effect in modifying the general discomfort, the injection of more than three pints of fluid was followed by the discharge of neither feces nor flatus. The patient spent a wretched night and the next morning his abdomen was even more distended and he hiccupped continually.

"The previous evening," wrote Allbutt, "I had been much tempted to puncture the abdomen with a fine trocar, and in the morning the desire strongly returned." It was in this state of mind that he encountered the celebrated surgeon Teale who was also making rounds in the hospital that day. Laying the facts of the case before his colleague he asked him if he would care to perform the operation. Mr. Teale willingly consented and, producing a fine Weiss trocar from his pocket, he plunged it straightway in the distended transverse colon. A hissing sound heralded the escape of a vast quantity of malodorous gas, and a second puncture, this time in the descending colon, completed the deflation of the abdomen. The patient expressed great relief and thanked his benefactors warmly. His face grew calm and he breathed comparatively easily and soon fell into a quiet sleep. Aided by injections of morphine and soothing poultices, he passed a comfortable night and awakened refreshed on the following day. To his great delight he found that his bowels had regained their activity and he was able to pass large quantities of flatus and abundant stools. It is regrettable that in this case the pul-

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monary consolidation spread and caused the death of the patient two days later, but it is of outstanding interest that postmortem examination of the cadaver revealed no trace of peritonitis and no sign of gas in the peritoneal cavity, and most significant that the sites of puncture could not be detected except on the outside of the body.

The publication of this case was followed shortly by an article by Dr. James Davey<sup>16</sup> of Bristol which revealed that at his suggestion Mr. Salmon of Thornbury had performed a similar operation in the previous year (1868) on a girl of nine years suffering from tuberculous peritonitis. As the disease approached its terminal phase the child became progressively emaciated and her abdomen was hugely distended. Palliative measures were of no avail, and realizing the desperate nature of the case Davey decided that it would be wisest to puncture the abdomen to relieve the distention. "The enormous quantity of gas or wind occupying the peritoneal sac, or it might be, the intestines, being nothing more or less than a foreign body, or at any rate, a product of abnormal action in the parts concerned, should be evacuated." This was the proposition he made to Mr. Salmon as they drove home together after the consultation. Mr. Salmon was not convinced, and so to support his contention Davey developed his argument to a further stage by maintaining that if instead of air they felt assured that there was fluid or water (ascites) within the abdomen an operation would surely be held to be imperative. This Mr. Salmon could not refute, and on the following day he performed the operation. The abdomen was punctured letting out an immense quantity of gas, which continued to discharge at intervals until the patient's death two weeks later. Mr. Salmon commented that "the operation gave great relief, and tended much to mitigate her suffering, previously to which the difficulty of breathing had been most distressing." Necropsy showed typical tuberculous peritonitis with deposits of lymph, adhesions, purulent effusion, and so forth. In addition there were three ulcers of the bowel, one of which had perforated, allowing feces to escape into the peritoneal cavity. This perforation, however, was nowhere near the site of the puncture.

Another protagonist of colocation was Dr. Fonssagrives<sup>22</sup> of Toulouse. In the *Medical Press and Circular* of April 7, 1869, it is re-

corded that by his advice intestinal puncture had been practiced "as a last resource" on two patients suffering from tympanites. The abdomen of the first of these was so swollen with gas that the patient was deeply cyanosed and on the brink of suffocation. An exploring trocar was inserted into the most distended part of the lower umbilical region and the gas escaped violently. The next day, as the distention had returned, two fresh punctures were made in different places and gave so much relief that the life of the patient was prolonged for four days. In the second case, six successive punctures restored to the patient the power of passing flatus naturally and thus effected a complete cure.

The following year, the operation was reported by Mr. Hancocke Wathen<sup>45</sup> of Fishguard. On reading of Allbutt's case he had decided to try the procedure himself in the first suitable case which came his way. His patient, a woman of twenty-nine years, was suffering from a fulminating acute peritonitis. She presented all the appearances of severe shock and her abdomen grew large and tympanitic. The usual palliative procedures produced free fecal evacuations but gave no relief from the distention. The patient rapidly became exhausted, and three days after the onset of the disease she expressed her willingness to submit to colocation. Using a No. 1 hydrocele trocar, Mr. Wathen punctured the transverse, the descending and lastly the ascending colon. A candle held near the scene of operation was extinguished by the force of gas escaping from the first two punctures. Great relief was expressed by the patient but her general condition was unsupportable and she gradually grew weaker and died the next day. Permission to hold a postmortem examination was not obtained.

Mr. Wathen<sup>46</sup> also referred to a case which had occurred in the practice of his friend, Staff-surgeon J. R. Thomas,<sup>43</sup> on the West Coast of Africa. The patient, an American, was smitten with chronic dysentery accompanied by a gradually increasing tympanites which eventually became intolerable and made him beg for relief by any means possible. Puncture of the transverse and ascending colon was practiced "with the best result" but unfortunately a few days later the patient, who had been up and about, "went in for a heavy debauch" and suffered a relapse which terminated fatally.

In October, 1871, Allbutt<sup>2</sup> announced that since

his first venture he had himself performed colocoentesis four times, "deeming it as venial an operation for a physician as the injection of morphia." He had used the Weiss No. 1 exploring trocar, which he now carried in his bag for that purpose, on three occasions, and his morphine needle twice. He regarded the trocar as being as innocuous as the needle and believed that it possessed the advantage of allowing the more rapid escape of gas. His individual cases are interesting.

In the first case the patient, an old man and a stranger to Leeds, had been taken ill suddenly in a second-rate lodging house of that city. Allbutt, summoned hastily during the small hours of the night, found him suffering from pneumonia, with severe orthopnea, an intermittent laboring pulse and a dusky complexion. His chief distress was the enormous distention of his bowel which pressed on his diaphragm and embarrassed his elderly and degenerate heart. The colon was punctured twice; gas rushed from the cannula with great violence and in a few minutes, revived by a dose of ether in hot brandy and water, he was able to lie down in peace. Some weeks later Allbutt was gratified to receive a letter posted from a distant village in Yorkshire in which the patient enclosed his fee and affirmed that his life had been saved by this timely intervention.

Another case of heart disease in which sudden and intense tympanites threatened to kill the patient was treated successfully by puncture of the colon, the patient's life being prolonged for weeks or months by the operation. Temporary relief was afforded to two patients with paralytic distention of the bowel developing in the course of febrile illnesses but both died subsequently from the severity of the causal disease.

The publication of these cases aroused a lively interest in colocoentesis and the literature of the period contains frequent references to this type of procedure. It became apparent moreover that it was not altogether such a novelty as had been supposed. Dr. Symes Saunders<sup>37</sup> not only provided this evidence but was able to endow the operation with a respectable historical background. He declared that the first man to use the trocar successfully in the treatment of tympanites was François de Paule Combalusier,<sup>40</sup> who is said to have performed the operation as early as 1754. Saunders suggested that the pro-

cedure may have evolved from the practice of "needling" the bowel during the operation for hernia, as advocated by Ambroise Paré, Corneille de Soelingen, and Pierre Dionis, and he drew attention to a passage in Heister's<sup>27</sup> "Surgery," where it is recommended that in pneumatocele or "hernia flatulenta," if ordinary remedies have failed, the scrotum should be perforated with a trocar, "which will demonstrate whether it was wind or water."

By the beginning of the nineteenth century the operation of colocoentesis had achieved recognition by the standard textbooks of the day. Benjamin Bell,<sup>5</sup> observing that the operative danger was slight in lower animals, advised that the intestine should be punctured in tympanites, and Callisen,<sup>10</sup> in his "System of Surgery" (1813), approved its use as a palliative in this condition. Charles Bell,<sup>6</sup> on the other hand, did not favor the operation, and said so bluntly. Zang,<sup>49</sup> giving precise instructions as to operative details, recommended that a long trocar should be introduced to a depth of 4 or 5 inches at the midpoint of a line extending from the foremost extremity of the second false rib on the left to the anterior superior iliac spine on the same side. At this site he believed it was possible to penetrate the descending colon without injury to its mesentery. He considered the operation to involve no more danger than simple puncture because, after withdrawal of the cannula, the wound in the intestine did not exceed half a line in extent. Roche,<sup>35</sup> writing in 1835, stated that, as a last resort, the abdominal wall may be punctured, and although he regarded the operation as dangerous he appreciated that it had been practiced a number of times with success. The 1852 edition of Chelius's<sup>13</sup> "Surgery" advocated paracentesis in distention of the alimentary canal when the ailment is idiopathic and not a symptom of other disease.

Although these observations are of great interest, their value is chiefly historical, for they contain no record of the cases in which the procedure was actually employed. The earliest case of which we have accurate details was published by Sir Henry Cooper<sup>14</sup> of Hull in 1857. Calling to see a woman of thirty-four years with complete intestinal obstruction caused by an inflammatory process, which occluded the ascending colon, he elected to puncture the cecum. The needle was left in place to allow the lymph to seal off its track and so prevent possible spread of



infection. The escape of flatus was followed by fluid feces and at the end of three days the needle was withdrawn and replaced by a gutta-percha tube which served to keep the wound open. The feces were kept soft by the exhibition of saline laxatives, and thirteen months later the patient was reported as being alive and well. She still used the puncture wound as a cecal outlet, no feces having passed from the anus since the operation.

The peculiar dietetic habits of the South Americans are reflected in a report by Olivieri<sup>32</sup> in 1861 of a series of cases, which savors almost of veterinary practice. He performed colocation in twenty cases in which the symptoms were those of abdominal distention caused by overloading the stomach with half-cooked vegetable food washed down with badly fermented liquor prepared from maize. Eight of the patients recovered in three weeks but the remainder died because treatment had been delayed until too late.

The first mention of the operation in the North American literature is to be found in Dr. Gross's<sup>26</sup> well-known "System of Surgery" published in 1866. Here, he described the case of a man with a perforating scirrhus of the sigmoid colon. The prognosis was hopeless from the start but great symptomatic relief was conferred by colocation and the patient's life was prolonged for some three weeks. The author was enthusiastic in his recommendation of the operation.

Reports published in France in 1871 state that Boinet<sup>8</sup> had frequently punctured the bowel as often as five or six times in one month without harm to the patient. The secret of success, he said, was to use a fine needle. Tarnier<sup>42</sup> reported several cases of internal strangulation which he had treated by this means. Desnos and Chalvet<sup>18</sup> successfully relieved a patient of hysterical tympanites by aspirating the distended bowel and, despite the fact that feces were withdrawn, no ill effects ensued. Puncture of the bowel was also tried for the relief of strangulated hernia and successful examples were recorded by Duplony,<sup>21</sup> Dugue<sup>20</sup> and Giralde.<sup>23</sup> The greatest significance of this adaptation, however, lies in certain experimental observations which evolved from it. Dolbeau<sup>19</sup> reduced a strangulated hernia by tapping the trapped bowel, the first puncture yielding liquid feces and the second, reddish fluid. The patient died next day of heart

disease and an opportunity arose to examine the loop of the bowel which had been punctured. It looked perfectly healthy and the puncture wounds could not be discovered. Even when it had been inflated with air under pressure it remained impervious and not one bubble of air escaped. In a thesis by Autun,<sup>4</sup> he described several experiments on rabbits in which he pierced the intestines in various directions without any ill effects to the animals.

The popularity of colocation grew rapidly among surgeons throughout the civilized world and its results were acclaimed with enthusiasm. Sir Howard Marsh<sup>30</sup> reported "great relief" and subsequent recovery; Lawson Tait<sup>41</sup> cited "numerous punctures for days on end" without adverse effect. Godfrey<sup>24</sup> of Chicago claimed to have cured a case of suspected intussusception by puncturing the abdomen in both iliac fossae and drawing off a pint of feculent fluid. Wentscher<sup>47</sup> recorded cure of ileus by puncturing the colon in the left nipple line above the navel. Martyn<sup>31</sup> of Bristol overcame an obstruction in the sigmoid by repeatedly tapping the descending colon with a trocar.

McGown<sup>28</sup> of Glasgow pierced the transverse colon of a patient in the throes of acute obstruction from an intussuscepting lesion in the left portion of the colon. Here are his words: "But now comes the wonderful part of the case. Three hours after the operation the patient had a very copious discharge from the bowels of dark clayish liquid feces, followed by a second an hour after the first. Seven hours after the operation a large quantity of gas was passed PER ANUM, and the next morning the abdomen was quite flat and the distention completely gone. The kidneys now began to act vigorously. The ordinary chamber utensil was filled three times in sixteen hours, and at the end of three days all the edema of the limbs had disappeared. The heart's action was now greatly increased; the pulse rose from 48 to 70 per minute. The patient has improved every day since the operation and is gaining flesh rapidly. . . . I look upon this case," he continued, "as one of the triumphs of surgery; and should a similar case present itself to any of my medical brethren, I hope they will not hesitate to give their patient immediate relief and the chance of complete recovery by the operation of Colopuncture."

Several authors claimed to have attacked the

small intestine with no less success. Thus Demons<sup>17</sup> of Bordeaux cited the case of a woman with a pelvic abscess and symptoms of intestinal obstruction which he treated by multiple punctures on six successive days until finally the abscess localized in the left fornix and it became possible to drain it by surgical means which also gave relief of the obstructive symptoms. In a case of obstruction occurring in the ileocecal region, Perry<sup>34</sup> recorded that he punctured the ileum and left the trocar in place for three to four hours until a large quantity of gas and a quart of fecal matter had been evacuated. The nausea and vomiting were reduced "as if by magic" and the distention was much relieved. Bell<sup>7</sup> of Edinburgh, commenting on a case of volvulus, in which the symptoms of abdominal distention had been mitigated temporarily by puncture, asked, "can we relieve this distention easily, painlessly and safely?" "I believe we can," he answered, "in the simplest manner, by tapping the bowel with a fine exploring needle." Rosenbach,<sup>36</sup> too, recognized the value of puncture as a palliative procedure and recorded four cases in which he had performed it successfully.

Colocentesis as a means of reducing distention preliminary to major abdominal operations has been employed on several occasions and cases reported by Pearse,<sup>38</sup> Cutler and Homans,<sup>15</sup> Sheen<sup>38</sup> and Frank L. Smith<sup>39</sup> indicate that in this capacity it met with a fair degree of success. It is interesting to note that in many of these cases the bowel had been subjected to the most drastic forms of therapeutic abuse before the puncture was finally performed. In Smith's case, for example, the patient had been treated with Clutterbuck's elaterium, pil. podophyllin co., croton oil and massive doses of belladonna by mouth, and mustard water, the long tube and even the pole of a galvanic machine had been introduced into the rectum in an endeavor to overcome the obstruction without resorting to operation.

As an aid to pre-operative diagnosis, aspiration of the colon was recommended by Maclaren<sup>29</sup> of Carlisle. "In the aspirator," he wrote, "we have an instrument which will determine whether any given portion of the colon contains liquid or not. If it does it is of necessity above the seat of stricture." Amussat<sup>3</sup> suggested that by puncturing the bowel and thus reducing the distention it might be possible to feel an otherwise impalpable lesion but he added that in his ex-

perience he had never had occasion to resort to this expedient.

The most ingenious modification of colocentesis is that described by Chadwick<sup>11,12</sup> of Boston. He had tapped the colon of a woman of thirty-two years in whom peritonitis had developed following ovariectomy, and the release of abdominal distention had given much relief at the time although her poor general condition arising from a habit of "free indulgence in spirituous liquors" had militated against a successful recovery. In reviewing this case he conceived the idea that it might be possible to inject some stimulant into the intestine after the gas had escaped. He believed that by this means the patient's strength might be sustained at a time when nothing could be kept in the stomach and absorption by the rectum was too slow to satisfy the needs of the body. He also wondered whether it might be possible to stimulate peristalsis by the injection of suitable liquids into the lumen of the bowel. The test was carried out on a young woman in whom peritonitis and ileus had developed following a complicated labor. When flatulent distention became so great as to impede her respiration, the smallest trocar of Potain's aspirator was introduced through the abdominal wall into what appeared to be the transverse colon or sigmoid flexure. A rubber tube attached to the cannula led by its other extremity to a basin of water, so that the escape of gas could be noted by the steady rise of bubbles in the water.

After a large amount of flatus had escaped, the tube was pinched, a syringe was connected to its end, and an attempt was made to inject beef tea into the intestine. The cannula became plugged by little shreds of meat which were floating in the liquid and the injection was thereby rendered impossible. As it would have taken considerable time to strain the fluid and this would have added to the mental agitation of the patient, a solution was made up of "very choice rye whiskey" in three parts of water and this was injected instead. The injection was successful, but the very first drops of the fluid gave the woman so intense colic—referred to a spot below the point of the injection—that it was stopped at once, for fear that the intestinal wall had dropped off the end of the cannula and that the whiskey had been allowed to enter the peritoneal cavity. As the pain soon subsided, the injection was resumed, with similar effect, ex-

cept that the pain was less acute and produced a sensation described as a "burning." It was not deemed justifiable to subject the patient to further suffering, and accordingly the experiment was abandoned after it had been definitely established that the cannula was still in the intestinal lumen, by allowing more gas to pass off before it was withdrawn.

The woman continued to complain of intermittent lancinating pains running down to the groin and these were clearly the result of peristaltic action. As this excessive peristalsis seemed undesirable in view of the inflamed condition of the intestines, a quarter of a grain of morphine was administered hypodermically. Ten minutes later the patient complained "that something was about to pass from the bowels." Digital examination revealed the presence of two large scybala in the rectum which had previously been empty, although not even flatus had escaped during the previous twelve hours. She died of septicemia two days later and no necropsy was allowed. At the conclusion of his paper Chadwick stated: "as a means of exciting peristaltic action, my procedure was eminently successful. The extreme sensitiveness of the intestinal mucous membrane to the contact of an alcoholic fluid so dilute as not to produce any astringent sensation in the mouth or rectum is worthy of note."

In a lecture to the students of Guy's Hospital on the subject of intestinal obstruction, Goodhart<sup>28</sup> drew attention to the danger of fecal contamination of the peritoneal cavity as a result of colocolocentesis, stating that he had seen a case in which fecal matter had escaped from the cannula, no relief had followed and the patient had died. We have been unable to find a case of this type anywhere in the literature but this may be explained on the basis of the infrequency with which failures find their way into print. At the time of publication Goodhart's warning did not pass unchallenged but was heartily contested by Mr. Alfred Sheen<sup>28</sup> of Cardiff. "I certainly cannot see the force of Dr. Goodhart's argument," he said. "I would submit, that as the gas escapes from the distended intestine the latter contracts and the arrangement of the muscular fibres of its coat would surely prevent the escape of its contents into the abdomen where such a small opening is made." This hypothesis is borne out by the experimental evidence which we have already quoted, and also by observations made on ma-

terial obtained at necropsy. It is further confirmed by the statement of Maclaren who attended the postmortem examination of a case in which the aspirator needle had been pushed into various portions of the bowel during the six hours preceding death and was unable to find any traces of its use. Certain writers have described cases in which peritonitis followed attempts to aspirate the contents of a strangulated hernia, but it can be readily appreciated that in this condition the bowel may be so devitalized as to be incapable of sealing off the wound made by the needle.

It is true that complications directly attributable to puncture for tympanites have been reported, but in the absence of strangulation—these have been few in number and relatively insignificant in effect. Broadbent<sup>9</sup> punctured the small intestine in obstruction caused by adhesions to an ovarian cyst. As the gas was escaping, the patient coughed and the intestine became displaced. The needle was rapidly withdrawn but a small amount of subcutaneous emphysema developed. This subsided completely in the course of time and no harm resulted. Worthington<sup>48</sup> described a case in which the transverse colon had been punctured; air escaped, followed by fecal fluid; the cannula then became blocked and had to be cleared with silver wire. The patient's temperature rose to 100.2° F. that night but had dropped to 99° F. by the next morning. A little local tenderness was experienced at the site of the puncture but it dispersed in two or three days. Wagstaffe<sup>44</sup> recorded that he successfully relieved an obstruction in a somewhat irresponsible young Irish physician by tapping his bowel. Four days later this gentleman rather imprudently elected to rise from his bed of sickness and go out for an hour's walk. In consequence some local peritoneal irritation developed but this also cleared up satisfactorily in a few days.

The weight of evidence therefore suggests that colocolocentesis is a relatively safe procedure and that, in addition to the ability of the bowel to seal the puncture rapidly, the peritoneum is well equipped to deal with any leakage which may occur. Certain precautions however have been suggested in order to make the operation even safer. The importance of tapping a coil of bowel which contains gas rather than feces has been stressed by Broadbent who has also drawn attention to the danger of tearing the bowel if care

is not taken to insert the needle at the point of greatest convexity of the distended loop. Should the needle become blocked, it is wiser to clear it by injecting air rather than by suction which might cause damage to the mucosa of the opposite side of the lumen of the bowel by drawing it against the sharp point of the needle. To prevent the escape of fecal contents from the cannula while it is being withdrawn, Wagstaffe suggested that a finger should be placed over the end of it to exclude the influence of atmospheric pressure. Perhaps this danger is more theoretical than real, for, in several of the reported cases, fecal material was withdrawn through the cannula and no complication ensued.

When, at the end of the last century, Lawson Tait demonstrated to the world that the abdominal cavity could be explored with relative impunity, intestinal obstruction became a major surgical emergency which demanded immediate laparotomy to enable the surgeon to see and cope with the actual cause of the obstruction. The older methods were discarded, and such remedies as O'Bierne's tube, Simon's procedure and a host of other examples of the ingenuity of a bygone generation were consigned unceremoniously to the scrapheap. With them went colocoentesis, and condemned by common vote as "enterostomy performed in the dark," it thus slipped quietly out of the practice of surgery.

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# GUARDING THE SUPPLY OF HELIUM

The U. S. government's helium plant in Texas is the world's sole producer of helium. About 15 per cent of the output of the plant is sold for medical, scientific and commercial use, the other 85 per cent of the output being supplied directly to the government. At the current rate of production this plant will produce by the end of the fiscal year about 14,000,000 cubic feet of helium. The plant has produced more than 110,000,000 cubic feet of helium since it began operations about twelve years ago. There are proposals now in Congress to increase both the well and the plant capacity. Measures are being taken to insure that no interruption in operation shall occur. Dr. R. R. Sayers, director of the Bureau of Mines, reported to the Secretary of the Interior that steel guard towers are being constructed at strategic points. A tower is being erected also in the gas field from which a general view of the government's helium properties can be obtained.—*Jour. A.M.A.*, May 17, 1941.



## CASE REPORTS

### CLINICAL-PATHOLOGICAL CONFERENCE

#### MINNEAPOLIS GENERAL HOSPITAL

Frank C. Andrus, Pathologist

The case is that of twenty-seven-year-old woman who was admitted to the hospital on April 15, 1941, and expired seven days later. Her present illness began on April 6, 1941, when she noted a sore throat. Her temperature was 102 degrees. She went to bed and remained there. On April 9, 1941, a nose and throat culture was taken which was negative for diphtheria bacilli. On April 10 the patient developed marked laryngitis, and on April 11, she coughed up several small pieces of what appeared to be a membrane. During this time, the patient's oral temperature had been ranging from 102 to 104 degrees and her throat was extremely sore. On April 12 she was admitted to a private hospital. Nose and throat cultures were repeated and were again negative. On April 15 the cultures of the nose and throat were positive for the first time and she was transferred here. Past history was negative. She was married and had three children who were living and well. Her youngest child was admitted to the hospital at the same time as the mother, also suffering from a sore throat. The cultures from the child's throat yielded diphtheria bacilli.

Physical examination on admission revealed an oral temperature of 101 degrees, a pulse rate of 115 per minute, and respirations of 24 per minute. The patient was well developed and rather obese. She did not appear to have any respiratory distress. There was a rather marked facial flush. Examination of the eyes, ears and nose revealed no abnormalities. Examination of the throat revealed a thick, dirty, greyish membrane covering the tonsils, uvula, and the pharynx. A slight amount of bleeding was noted at the margins of the membrane. There was moderate enlargement of the anterior and posterior cervical lymph nodes. The lungs were clear to percussion and auscultation. The heart showed a normal sinus rhythm and no murmurs were heard. The abdomen and extremities were negative. She was having fairly marked difficulty in speaking at this time and the impression of the staff was that she was suffering from pharyngeal and laryngeal diphtheria.

The hemoglobin was 92 per cent with a leukocyte count of 15,000 of which 83 per cent were polymorphonuclears, 14 per cent lymphocytes, and 4 per cent monocytes. Examination of the urine revealed the specific gravity to be 1.029. It contained four plus albumin, occasional granular casts, many red cells (menstrual blood), and occasional white cells in a non-catheterized specimen. A nose and throat culture was negative. A guinea pig was inoculated from a culture and while it became sick, it recovered. On the day of admission,

the patient was given 40,000 units of diphtheria antitoxin intramuscularly and 40,000 units intravenously. On the evening of the same day, she coughed up a cast of the trachea, larynx, and a good portion of the bronchial tree. Diphtheria bacilli were found on direct smear of this membrane. On April 16, at approximately 12:15 a.m., the patient had a severe coughing spell and coughed up a thick piece of membrane measuring 2 x 1 inches. Again, following a severe coughing spell, at 4 a.m. on April 16 she coughed up another piece of membrane measuring 1 x 1 inches. Later in the morning of April 16, the patient appeared to be much better and stated that her throat was less sore. Her temperature had fallen to 100 degrees.

On April 17 her temperature was 105.4 degrees by mouth. She suddenly became very listless, her pulse very thready and 140 per minute. There was no respiratory distress but her lips and fingernails were cyanotic. The heart tones were barely audible, but there was no irregularity. The blood pressure was 80/60. Examination of the chest revealed coarse rhonchi throughout both lungs. There were, however, no areas of dullness. Numerous petechiae appeared over the right flank and upper chest. The impression at this time was that the patient now had a diphtheritic myocarditis. On April 18 the patient's temperature had fallen to 102 degrees and her pulse rate to 120 per minute. She appeared to be much better. An x-ray film of the chest revealed a complete consolidation of the right upper lobe. There appeared to be some atelectasis along with the consolidation. There was also some increased density in the para-hilar region on the right side and in the lower half of the left lower lobe. A blood culture taken at this time was negative. On this day, April 18, the patient received a total of 660 c.c. of fluid but she had no output of urine. An effort was made to type the sputum but no pneumococci were found. The sputum was inoculated into a mouse but its peritoneal fluid was sterile at the end of seventeen hours. On April 18, she was given four grams of sodium sulfathiazole intravenously. This was followed by one gram intravenously four hours later. Her respirations were very rapid and shallow. She appeared to be quite comfortable; her color was good. The pulse was fairly strong but it was now markedly irregular. For the first time, a one plus pitting edema was noted over the tibial regions. The venous pressure was 15 cm. of citrate solution. Urinalysis now revealed the specific gravity to be 1.022. The urine contained four plus albumin and occasional red and white cells. The patient developed a pharyngeal paralysis. It was

## CASE REPORTS

thought that the edema and the irregular pulse were due to diphtheritic myocarditis. Because of the severe oliguria, it was considered necessary to give the patient additional fluids in spite of the probable heart failure. The sodium sulfathiazole therapy was discontinued because of the oliguria and the fact that no pneumococci could be isolated in the sputum or on mouse inoculation.

In the evening of April 18, an electrocardiogram revealed slight slurring of the QRS complexes in all three leads, a sinus tachycardia, and occasional ventricular extrasystoles. On April 19 the patient's temperature ranged between 100 and 101.5 degrees and her pulse between 110 and 120 per minute. She was given 2000 c.c. of 10 per cent glucose intravenously at a very slow rate and her total intake for this day was 2830 c.c. Her output, however, for the twenty-four-hour period was only 200 c.c. This urine had a specific gravity of 1.023, contained four plus albumin, and occasional red and white cells. The patient appeared extremely toxic and her respirations were gasping in character. The pulse was of a fairly good volume but was again noted to be irregular. Moderate edema was noted over both extremities and over the sacrum. Examination of the chest on this day revealed consolidation bilaterally. An electrocardiogram was repeated and revealed extra-systoles occurring as a pulsus trigeminus. The P-R interval varied between .14 and .16 seconds. Otherwise, there was no change from the previous tracing. The blood urea nitrogen was 103 mg. and the creatinine 5 mg. per cent. The carbon dioxide combining power was 38 volumes per cent. Blood pressure determinations during the day of April 19 were 96/60, 98/65, and 104/68. The patient's temperature was 100.4 degrees on April 20 and her condition appeared even more critical than previously. Her respirations were very rapid and shallow but she responded quite well. The cardiac decompensation did not appear to be any more severe. The petechiae seemed to be disappearing. The pulse rate was now regular at 100 per minute and of good volume. She received 1000 c.c. of fluid intravenously during this twenty-four-hour period, this being her only intake. Her urinary output was 425 c.c. Examination of this urine revealed a specific gravity of 1.022, three plus albumin, many granular casts, 10 to 12 red cells, and numerous cellular casts. The question of acute glomerular nephritis was now raised. During the evening of April 20 she suddenly became very dyspneic and was given a BLB mask with 100 per cent oxygen. The dyspnea seemed to improve under this therapy. On April 21 very little change in her condition was noted. The heart tones were quite loud and there were occasional extrasystoles. No murmurs were heard. However, her pulse rate varied as much as 40 beats within a period of five minutes. Her fluid intake was 1000 c.c. intravenously and her output was 750 c.c. Examination of this urine revealed the same findings as before. Her blood urea nitrogen was now 81.6 mg. per cent. On the evening of April 21 her temperature became elevated to 103 degrees and her respirations to 56 per minute. The pulse rate was 120 per minute although it

would vary considerably in rate within a few minutes. On the morning of April 22, the pulse rate seemed somewhat stronger although it was still quite irregular. The patient was very restless, cyanotic, and her respirations were 54 per minute. Her pulse gradually became weaker, her temperature became elevated to 106 degrees and she expired.

*Clinical Diagnoses:* Pharyngo-laryngo-trachea-bronchial diphtheria, myocarditis, pneumonia, possible acute glomerulonephritis.

### *Anatomic Findings (Dr. Martin Buehler):*

The body is that of a well developed and rather obese white woman. There are numerous small, scattered petechiae over the lateral sides and the anterior surface of the chest, the upper arms, and the abdomen. The mouth contains a quantity of dried blood. There is a one-plus pitting edema of the ankles, the pre-tibial regions, and the sacrum. There is cyanosis of the fingernails and the lips.

The heart weighs 280 grams. The heart muscle shows cloudy swelling, the myocardium being pale and flabby. The valves of the heart are entirely normal. The coronary arteries are normal.

The right lung weighs 1220 grams and the left lung weighs 940 grams. There is a complete, red consolidation of the entire left lower lobe and the superior three-quarters of the upper lobe of the left lung. These portions of the lung are entirely airless and solid. A profuse bloody discharge is easily expressed from the cut surface. There is complete consolidation of the entire right upper and lower lobes and one-half of the right middle lobe. The bronchi are traced to their terminal branches and all are filled with bloody, frothy fluid. There is, however, no evidence of any membrane at this time.

The liver shows a minimal degree of chronic, passive congestion.

The right kidney weighs 240 grams and the left kidney weighs 220 grams. Both kidneys reveal cloudy swelling. The cortices and pyramids appear normal.

A hemorrhagic, pseudo-membrane is noted in the trachea and in the larynx. There are a few mediastinal and paratracheal enlarged lymphnodes.

### **Discussion**

DR. FRANK C. ANDRUS: Microscopic study of the kidneys reveals only cloudy swelling and albuminous casts in the tubules. There is no visible glomerular change. The uremia is probably partly due to the fall in blood pressure.

The myocardium shows an acute, exudative, interstitial myocarditis. The trachea and larynx have the characteristic changes of diphtheria, part of the membrane being still present.

The lungs show a well-marked pneumonia of the type often seen due to streptococci. With all of the denuded surface of the trachea and bronchi, it is easy to postulate a portal of entry.

*Anatomical Diagnoses:* (1) Pharyngo-laryngo-tracheo-bronchial diphtheria; (2) Acute exudative myocarditis; (3) Myocardial failure, mild; (4) Pneumonia, probably streptococcal; (5) Cloudy swelling of liver, heart, and kidneys.

## CASE REPORTS

DR. EDWARD L. STREM: From January 1, 1934, to the same month of 1941, there have been 161 cases of diphtheria of all types treated in this institution. In reviewing the records of these patients, it was found that the age distribution ranged from early infancy to late adult life (Chart I). Of the entire group, 45 per cent were children from eight months to fifteen years, and the remaining 55 per cent were individuals from fifteen to sixty-seven years.

TABLE I. THE DIFFERENT TYPES OF DIPHTHERIA ENCOUNTERED AND THEIR INCIDENCE

Type	Number of Cases
Pharyngeal	128
Laryngeal	14
Pharyngo-laryngeal	13
Naso-pharyngeal	3
Nasal	1
Naso-pharyngo-laryngeal	1
Diphtheritic balanitis	1
TOTAL	161

The most commonly encountered type of diphtheria was that involving the pharynx. Next in frequency were the laryngeal and pharyngo-laryngeal types. These three comprised 155 of the total number. Their incidence is shown in Table I.

There was a history of previous attack of diphtheria

TABLE II. COMPLICATIONS OBSERVED IN 161 CASES OF DIPHTHERIA

Complication	Number of Instances
Myocarditis	7
Pneumonia	7
Atelectasis of lung	2
Paralyses	2
Acute glomerulonephritis	2
Edema of lung	1
Edema of larynx	1
Cerebral damage from asphyxia	1
TOTAL	23

in two cases: one thirteen years before and the other five years. One of these had received antitoxin. Five patients had been actively immunized, one to three years prior to contraction of the disease.

Antitoxin was administered in all but two instances. Of twenty-eight patients with laryngeal involvement,

TABLE III. YEARLY INCIDENCE AND MORTALITY RATE OF DIPHTHERIA AT MINNEAPOLIS GENERAL HOSPITAL 1934 TO 1941

Year	Number of Cases	Deaths	Mortality Rate (Per Cent)
1934	59	4	6.7
1935	22	3	13.6
1936	45	7	15.5
1937	5	0	0
1938	8	2	25
1939	8	1	12.5
1940	14	3	21.4
TOTAL	161	20	12.4

fourteen required interference to combat asphyxia. This consisted of intubation in five, tracheotomy in eight, and bronchoscopic aspiration in one. Of these, there were seven deaths, six occurring in children under ten years of age.

Complications were encountered in 9 per cent. Myocarditis and pneumonia were by far the most frequent.

JUNE, 1941

Edema of the lung, of the larynx, and cerebral damage from asphyxia were the least commonly observed. Paralyses, acute glomerulonephritis, and atelectasis of the lung comprised the intermediate group. These complications are tabulated in order of frequency, Table II.



Chart I. Age incidence and fatality of 161 cases of diphtheria.

The yearly mortality rate varied from zero to twenty-five per cent. For the entire period, the mortality rate was 12.4 per cent (Table III).

The twenty fatal cases showed laryngeal involvement in fourteen and pharyngeal in five. The remaining case was a diphtheritic balanitis. The greatest number of deaths occurred in the youngest age groups. This is represented by the shaded areas in Chart I.

DR. E. T. BELL: I have seen numerous cases of laryngeal diphtheria with negative throat cultures. Cultures were checked by expert laboratories and still came back negative. You simply have to go by the clinical impression and give antitoxin. If you wait for positive cultures, things happen as they have in this case. It is rather surprising to see such a large number of older people with diphtheria. It brings out well the point that diphtheria is by no means exclusively a disease of childhood.

DR. A. V. STOESSER: I am sure that if you take a careful enough history in most of these cases, and if you go back into their history far enough, you will find that they have had a sore throat for some time. The difference between the cases we see today and those we saw some years back is that they are now not discovered soon enough. Physicians are not looking for diphtheria as they used to. A few years ago, if the doctor saw a patient with a sore throat, a culture was taken, usually by himself. I think that it is a mistake to permit nurses and orderlies to take nose and throat cultures. We must emphasize the importance of taking the cultures in the presence of sore throat whether it be in a child or in an older individual. Another thing that should be mentioned is the dosage of antitoxin to be administered. For some time, we made the mistake of giving too little antitoxin. Now we give adequate amounts. Some physicians believe that antitoxin in large doses is harmful, but I see no evidence of that. Any excess of antitoxin administered is merely excreted in the urine.

DR. E. T. BELL: What per cent of the children in this community have been immunized to diphtheria?

DR. A. V. STOESSER: I do not know the exact per centage but we have a very poor record here in comparison to some of the other large cities. There is no doubt but that when Schick tests are negative, that community is rid of diphtheria.

## CAROTIDO-CAVERNOUS FISTULA\*

KARL C. WOLD, M.D., and ROBERT W. HOLMEN, M.D.  
Saint Paul, Minnesota

**T**RAUMATIC rupture of the internal carotid artery in its passage through the cavernous sinus is the most frequent anatomical cause of pulsating exophthalmos, according to Meyer and Sugar who have reviewed the entire literature to 1939 and found 786 cases of this rare condition. The next most frequent cause is a spontaneous fistula between these vessels, usually due to a generalized arteriosclerosis and less commonly to vascular syphilis, and found in an older age group. Other causes are vascular tumors of the orbit or surrounding tissues, simple aneurysms of the ophthalmic artery, arteriovenous fistula involving the internal carotid artery and the internal jugular vein at the entrance of the carotid canal, arteriovenous communications within the orbit, and absence of a large part of the orbital roof.<sup>1</sup>

The typical picture of pulsating exophthalmos due to carotido-cavernous fistula follows a head injury severe enough to cause a period of unconsciousness. Soon after recovering consciousness the patient becomes aware of a rushing noise in his head which is more marked when he is lying down or is in a stooped position. Double vision caused by paresis of one or more of the ocular muscles, usually including the lateral rectus, makes its appearance. Vision fails, and the eyeball bulges from its socket. Pulsation of the orbital contents may or may not be obvious. Edema of the conjunctiva is common. A swishing bruit, synchronous with the pulse beat, may be heard through the stethoscope when placed over the orbit or temporal region and may be caused to disappear or to be modified by digital compression of the common carotid artery. Examination of the eye grounds reveals evidence of engorgement.

Treatment is necessary for visual, subjective, and cosmetic reasons. According to de Schweinitz 20 per cent of all cases terminate in blindness and no more than 11 per cent retain normal vision. Rest may result in clot formation and a spontaneous cure. Surgical treatment includes ligation of the internal or common carotid artery. Whether to ligate the internal carotid or the common carotid is apparently a moot question. But either ligation should be preceded by gradually increasing periods of digital compression of the common carotid artery until the patient is able to tolerate such compression for at least thirty minutes.<sup>2</sup>

The collateral circulation, after ligation of the common carotid, is carried on by the anastomosis of the internal carotid with its fellow of the opposite side through the circle of Willis, by the vertebral with the opposite vertebral, by the inferior thyroid with the superior thyroid, by the deep cervical branch of the costocervical trunk with the descending branch of the occipital, by the superior thyroid, lingual, facial, occipital, and temporal arteries with their mates of the

opposite side, and by the ophthalmic with the angular. The anastomosis between the deep cervical branch of the costocervical trunk with the descending branch of the occipital is an important one.<sup>3</sup>

Following its passage through the carotid canal in the petrous part of the temporal bone, the internal carotid artery passes through the entire length of the cavernous sinus which lies along the side of the sphenoid bone. This venous sinus occupies the interval between the endosteal and meningeal layers of the dura mater. In the posterior part of this interval lies the Gasserian ganglion. This venous space extends from the medial end of the sphenoidal fissure in front to the apex of the petrous bone behind. Its lateral wall contains the oculomotor and trochlear nerves and the ophthalmic division of the trigeminus, lying in this relation from above downward. In close contact with the internal carotid artery in its passage through the sinus lies the abducens nerve. These two structures are separated from the venous blood only by the endothelial lining of the sinus.<sup>4</sup>

The cavernous sinus is broken up into many endothelial-lined, intercommunicating compartments by numerous trabeculae. Anteriorly it receives the ophthalmic vein, with which it is practically continuous, and the sphenoparietal sinus. Communication with its fellow on the other side is effected through the small anterior and posterior intercavernous sinuses which cross the midline before and behind the hypophysis. Posteriorly it ends in the superior and inferior petrosal sinuses. The sphenoid bone inferio-medially provides the sinus with its only bony relationship.<sup>4</sup>

When a communication develops between the artery and the sinus there is a disruption of the local arterial and venous blood pressures. The ophthalmic vein, in addition to its normal venous load, is forced to receive arterial blood under high pressure from the internal carotid artery. The intersinus communications being unable to cope with the increased volume of blood, the sinus and the ophthalmic vein with its tributaries become dilated. As a result of this dilatation and the engorgement of the soft tissues of the orbit, there develops an exophthalmos and a pulsating swelling behind the medial angular process of the frontal bone. The passage of arterial blood through the abnormal channel may be heard as a rushing bruit when the stethoscope is placed over the orbit or temporal region. The loss of vision and the ophthalmoplegia may be explained by injury to the optic, oculomotor, trochlear, and abducens nerves. This injury may be effected by the original trauma, by the dilatation of the sinus in whose lateral wall most of these nerves lie, by impaired nutrition, by pressure, or by the stretching induced by the proptosed eyeball.

The following describes a case of arteriovenous fistula involving the internal carotid artery and the cavernous sinus.

\*Read in abstract before the Minnesota Academy of Ophthalmology and Otolaryngology, December 13, 1940.



## CASE REPORTS

The patient is a young married man, thirty years old, and in good general physical condition. He was first seen on May 9, 1940, five days after being struck by a fist over the left temporal region, a blow which stunned him momentarily but which did not cause unconsciousness. His first complaint was double vision, appearing almost immediately following the injury and progressing daily.

At the time of his first visit his complaints were double vision, pain through the left eye radiating to the back of the head, and intermittent slight nosebleeds from the left nostril. Examination revealed a normal appearing left eye with no congestion, proptosis, or hypertension. Vision was 6/6-3 and the eyegrounds were normal. The Maddox rod test showed an esophoria of nine degrees. The nasal bleeding was found to be caused by an ulceration in Kisselbach's area of the septum. A temporary diagnosis of paresis of the left external rectus muscle following a cerebral concussion was made. The septum was cauterized and the left eye was covered with a pad.

On May 14, five days later, the patient was seen again. He complained of increased pain in and about the left eye and described a swishing noise in the region of the left ear when in a recumbent position. A moderate proptosis had developed and a slight nystagmus was noted. Vision had dropped to 6/7-3 but the eyegrounds were still normal. No bruit was discernible with the stethoscope. The patient was asked to return in three days, but he was not seen until a month later. During this interval he had been taking chiropractic treatments. By this time the picture had changed considerably. Proptosis of the eyeball was now very pronounced, although the eye could be pressed in to present an almost normal appearance. It would recede spontaneously at times, according to the patient. The eyeball was completely immobile due to a complete paralysis of all of the extrinsic ocular muscles, including the levator. Vision was found to be less than 6/120 but the eyegrounds were still normal. The swishing noise heard by the patient had increased and was more pronounced when the eye was bulging and when he was lying down. On this occasion a loud rushing bruit synchronous with the heart beat could be heard with the stethoscope placed over the eyeball and over the left temporal region. The bruit could be made to disappear by pressure over the left common carotid artery. The blood Wassermann was found to be negative. A diagnosis was then made of an arteriovenous fistula involving the internal carotid artery and the cavernous sinus. An x-ray examination disclosed no evidence of skull fracture but did show an abnormality in the formation of the left optic foramen and of the left sphenoid fissure, these changes possibly being due to erosion by an impinging aneurysm or tumor.

At the suggestion of Dr. William Peyton of the University surgical staff daily digital compression of the common carotid artery was begun. This was done to stimulate the establishment of collateral circulation as preparation for carotid ligation. Whereas the patient could tolerate the procedure but a few minutes at first, he could stand thirty-five minutes of compression at the end of three weeks. During this period the proptosis increased and the entire left side of his face became swollen. The bruit became more pronounced and all subjective symptoms increased in severity.

On July 2, two months after the accident, a ligation of the left internal carotid artery was done under intra-tracheal anesthesia. This resulted in a slight lessening of the symptoms and an alteration in the quality of the bruit but did not cause it to disappear. Nor was the proptosis affected. However, the conjunctiva became severely edematous. Ten days later the neck was again entered and the common carotid ligated. Immediately the bruit ceased and the head noises and headache disappeared. Six days later the patient was able to leave the hospital. At this time his vision enabled him to count fingers at five feet. The eyeball had returned to its normal position in the orbit but was immobile. The upper lid was flaccid.

Vision rapidly returned. Within four weeks after operation the patient read 6/21+2. In another month his vision had improved to 6/12-2 and in one more month to 6/9-1 where it has remained. The return of muscle action has been extremely slow. No ocular motion was discernible until seven weeks following operation. At this time slight motion down and out was observed. At the ten-week stage motion up was noticed, and at the end of thirteen weeks some motion in all directions and the first noticeable lid movement was present. Since this time improvement in motion of the eye and lid has progressed slowly and continues to improve so. At the present date, twenty-six weeks following ligation, motion of the eyeball is estimated roughly at 25 per cent and motion of the lid at 75 per cent of normal.

With the advent of cold weather and probably due to incomplete closure of the lids the patient developed a large corneal ulcer which was extremely difficult to bring under control.

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## LEIOMYOMA OF THE UTERUS COMPLICATING PREGNANCY

W. L. PALMER, M.D., F.A.C.S., and HARRY B. NEEL, M.D.

Albert Lea, Minnesota

**L** EIOMYOMATA uteri, or uterine fibroids, are the most common abdominal tumor encountered by the general surgeon. A knowledge of their pathology and an understanding of the proper methods of diagnosing and treating them constitute a large portion of the armamentarium of the gynecologic surgeon.

The association of uterine fibroids with sterility has long been observed but it has not been established that fibroids cause infertility. In fact, fibroids constitute one of the most common complications of pregnancy. In

pregnancy some of the fibroids move upward with the growing uterus and assume a position in the abdomen while others, such as cervical fibroids, remain in the pelvis. As the pregnant uterus enlarges and its wall becomes thin, tumors which were not detectable before pregnancy become prominent and are easily palpable through the abdominal wall. Not only are the fibroids made more conspicuous by their altered position, but they actually engage in the succulence and hypertrophy characteristic of pregnancy. It is said that they are

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stimulated by the rich blood supply of the pregnant uterus.

The type of complication caused by a fibroid during pregnancy depends upon several factors. A tumor high in the uterus is more likely to produce abortion or pre-

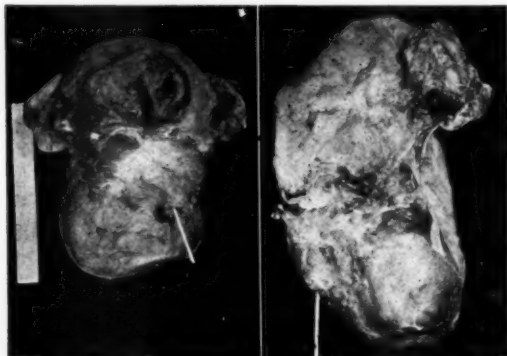


Fig. 1. (left) Anterior-posterior view of the surgical specimen. The upper half comprises the puerperal uterus with the incision through which the child was extracted. The lower half of the specimen is the cervical fibroid. A probe protrudes from the cervical canal. The molding of the tumor is obvious.

Fig. 2. (right) Lateral view of the uterus and fibroid. It is readily seen that the fibroid is nearly as large as the contracted uterus and that its shape conforms to the configuration of the pelvis.

mature labor than a cervical fibroid, while the latter may obstruct descent and delivery of the child. Submucous fibroids have a greater tendency to produce abortion than interstitial and subserous fibroids. Pedunculated fibroids may become twisted on their pedicles and cause excruciating pain. Such an accident may lead to gangrene of the tumor and abortion. Rupture of the uterine wall is one of the most serious catastrophes to which uterine fibroids are said to predispose.

The management of uterine fibroids usually presents no great difficulty but in exceptional cases the judgment and skill of the surgeon are taxed. Especially in pregnancy is it difficult to determine the safest procedure, the one that offers the best chance of survival to both mother and child. There are some who advocate myomectomy early in pregnancy. It is hardly justifiable to make this procedure a routine because many pregnancies are not disturbed by the small fibroids in the uterine wall, and the operative procedure may produce abortion. If the fibroid is large and it seems reasonable that pregnancy might be interfered with by its presence, surgical removal of the tumor is indicated. The patient should be informed that surgical intervention, although indicated, is occasionally followed by premature labor.

Even in those cases in which delivery is effected successfully in the presence of a fibroid the possibility of a complication has not been avoided. During the puerperium, fibroids will delay involution of the uterus and may obstruct the lochial flow. DeLee has said that they predispose to thrombophlebitis and infection. The sudden diminution of the blood supply to a fibroid

after parturition may lead to degeneration of the tumor. Titus stated that this is the complication most frequently encountered.

In many instances it is advisable to postpone operative intervention until term, or near term, when the prospects of a viable child are good. Cesarean section can then be performed and the fibroid dealt with in the best possible manner. If the patient is elderly and has other children, hysteromyomectomy is the procedure of choice. If the patient is young and desires more children every effort should be made to save the uterus.

A patient recently referred by Dr. L. Hanson, of Frost, Minn., presented some of the difficulties encountered in pregnancy complicated by a large fibroid.

The patient was a secundi-gravida, thirty-one years of age. The family history and past history were essentially negative. The one child had been delivered normally nine years ago but the patient was said to have had a severe laceration. The date of the last menstrual period was February 8, 1940. The patient did not consult a physician for prenatal care.

Early on September 19, 1940, the patient fell into labor and the membranes ruptured soon thereafter. She consulted her physician and was examined. The fundus of the uterus was just below the xiphoid. The fetal parts were palpable on the right side and the fetal heart was audible in the left lower quadrant of the mother's abdomen. There was a ballotable mass just above the symphysis pubis but on rectal examination there was found a large mass which filled the pelvis and seemed to be the fetal head. The cervix was not identified. Although the uterine contractions were strong and frequent, there was no change in the findings after several hours. The patient was admitted to the Næve Hospital. She was again examined and the impression was that a large pelvic tumor obstructed the descent of the child. Cesarean section was decided upon.

Under nitrous oxide, oxygen and ether anesthesia a low mid-line incision was made. The uterus was symmetrically enlarged and the entire pelvis was filled with a large tumor, the consistency of which was similar to that of a fetal head. It arose from the posterior aspect of the cervix. An incision was made into the uterus and a live male baby which weighed three pounds, ten ounces, was delivered at 7:25 p. m. The position and size of the tumor made it impossible to do a myomectomy and preserve the uterus, so removal of the tumor and subtotal hysterectomy were indicated and performed. The fibroid had been so well molded into the pelvis that it was difficult to extract it and when it was finally removed there was a noise like that produced when a cork is quickly withdrawn from a bottle. The pelvis was peritonealized and the abdomen closed in the usual manner. The patient left the operating room in good condition.

The fixed specimen measures 19.5x13x12 cm. The contracted uterus and the tumor are approximately the same size as is demonstrated in Figures 1 and 2. Microscopic sections of the tumor reveal the typical picture of leiomyoma.

The patient made an uneventful convalescence and the infant gained weight rapidly.

NOTE: We wish to express our indebtedness to Dr. E. S. Palmerton for the illustrations accompanying this article.

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## HISTORY OF MEDICINE IN MINNESOTA

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### HISTORY OF MEDICINE IN BROWN COUNTY

Compiled by George B. Weiser, M.D.

*(Continued from May issue.)*

#### Later Physicians in New Ulm

**Dr. Theodore F. Hammermeister** was born in Eden township, Brown County, near Morgan, Minnesota, July 25, 1887. He graduated from the University of Minnesota, Bachelor of Science, 1913; Doctor of Medicine, 1915, and served his internship at Northwestern Hospital, and Elliott Hospital, University of Minnesota.

Dr. Hammermeister located in New Ulm June 15, 1915, and has been in continuous practice there to date (1940). During his first four years he was associated with Dr. O. C. Strickler. He has been health officer of New Ulm since 1937; president of the local Board of Education for the past seven years. He is a member of the Redwood-Brown County Society, the Southern Minnesota Medical Association and the American Medical Association. He took postgraduate work at New York Polyclinic Medical School, the New York Postgraduate School, and in the Laboratory of Surgical Technique, Chicago, Illinois.

**Dr. A. L. Kusske** was born in Sibley County, June 24, 1894. He graduated from the University Medical School in 1907, and was located at Hutchinson, Minnesota, from 1911 to 1916. He took a postgraduate course at Illinois Eye and Ear Infirmary and then located in Minneapolis, 1918 to 1924. He was assistant in the Eye Department of University of Minnesota Medical School from 1918 to 1924.

He moved to New Ulm in 1924 and has practiced there continuously to present time (1940). He confines his practice to his specialty, eye and ear diseases.

**Dr. F. J. Pelant** was born in Montgomery, Minnesota, July 31, 1886. He received his preliminary education at St. Thomas College and Saint Paul Seminary and graduated in medicine at the College of Medicine and Surgery, Chicago, in 1916. He served his internship at St. John's Hospital, Springfield, Illinois, and did postgraduate work at the New York Polyclinic in 1916. After graduation he practiced for a brief period in Iowa before coming to New Ulm.

**Dr. Frederick H. Dubbe** was born at Jordan, Minnesota, April 27, 1895. He attended high school at Jordan and Carleton College, 1912-1913, before attending the University of Minnesota, where he received the B.S. degree in 1915. He graduated from the University of Minnesota Medical School in 1919 and served his internship at the Minneapolis General Hospital, 1919-1920.

On June 1, 1920, Dr. Dubbe located in New Ulm where he has been in continuous practice to the present time (1940). He is a member of the Redwood-

## HISTORY OF MEDICINE IN MINNESOTA

Brown County Society, the Southern Minnesota and State Medical Associations and the American Medical Association, and a fellow of the American College of Surgeons. He is local surgeon for the Chicago & Northwestern and Minneapolis & St. Louis Railroads and a member of the American Railway Medical Society.

**Dr. Clifford T. Ekelund** was born in Saint Paul, Minnesota, December 7, 1893. He received his B.S. and M.D. degrees at the University of Minnesota Medical School. During the World War he served in a base hospital in France until March, 1919, followed by an interlude of eighteen months with the American Expedition to Poland, organizing, doing surgery, etc.

Returning from the war he became a teaching fellow in the Graduate School of Medicine at the University of Minnesota and was chief resident in medicine at the Minneapolis General Hospital. The following year he became chief resident in surgery at the University Hospital for two years. From January 1, 1923, to July 1, 1923, he was associated with Dr. T. F. Hammermeister at New Ulm. In July, 1923, he became a member on the staff of Rood Hospital, Hibbing, Minnesota, remaining there three years; then moved to Pontiac, Michigan, where he has been continuously engaged in the practice of medicine and surgery. He was elected for the term of one year as secretary of the Michigan State Medical Society.

**Dr. Albert Fritsche** was born in New Ulm January 31, 1893. He graduated from the New Ulm high school in 1911, attended the University of Wisconsin as a pre-medical student, 1911-1913, attended the University of Wisconsin Medical School, 1914-1917, and graduated from the Chicago College of Medicine and Surgery, Loyola Seminary, in 1918. He served his internship in the Norwegian-American Hospital, also Asbury Hospital, Minneapolis.

He became associated with his father, Dr. L. A. Fritsche, in the Fritsche Clinic, in 1919 and has continued there to the present time (1940), specializing in surgery. He was a member of the Medical Reserve Corps in active duty, 1917-1918; vice president of the Minnesota State Medical Association, 1940; and is a past president of the Southern Minnesota Medical Association. He is a Director of the Citizens State Bank of New Ulm and the New Ulm Roller Mill Company.

**Dr. William Henry Fritsche**, son of Dr. L. A. Fritsche, was born March 20, 1895. He graduated from the New Ulm high school, 1913; attended the University of Minnesota, 1915-1916; graduated from Marquette Medical School, 1919; served his internship in the New York Lying-in Hospital. Beginning October, 1919, he was associated with the Fritsche Clinic until his death in 1923.

**Dr. F. D. Hurd**, a graduate of University of Minnesota Medical School, first located at Hibbing, then came to New Ulm in 1926. He was associated with the Fritsche Clinic for six months, then moved to Great Falls, Montana.

**Dr. Carl John Fritsche** was born at New Ulm January 14, 1904. He graduated from the New Ulm high school, attended the University of Wisconsin, 1922-1924; University of Minnesota, 1924-1926; Northwestern University Medical School, Chicago, 1929, and served his internships at the Norwegian-American Hospital, Chicago, 1930, and the McCormack Institute of Infectious Diseases,



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1929. He located in New Ulm in January, 1930, and has been associated to present date (1940) with the Fritsche Clinic. He was commissioned First Lieutenant in the Medical Reserve Corps in 1932.

**Dr. Theodore R. Fritsche** was born in New Ulm October 23, 1906. He attended the New Ulm high school and graduated from the University of Minnesota, B.S. degree, 1928. He graduated from the University of Minnesota Medical School in 1931 and served his internship at Letterman General Hospital, U. S. Army, San Francisco, 1930-1931. He had a Fellowship in the Illinois Charitable Eye and Ear Infirmary, 1931-1933, and the Ancker Hospital, Saint Paul, 1933-1934.

Dr. Fritsche located in New Ulm in October, 1935, being associated with the Fritsche Clinic. He received degrees from the American Board of Ophthalmology, 1937, and the American Board of Otolaryngology, 1938, and is a fellow of the Academy of Ophthalmology and American College of Surgeons, of which he was second vice president in 1940.

**Dr. Cornelius A. Saffert**, born January 12, 1903, received his high school education in New Ulm and at St. Thomas Military Academy, Saint Paul. He entered the University of Minnesota in 1921 and received his B.S. degree in 1923; medical degree in 1926. He served his internship at the Minneapolis General Hospital from 1924 to 1926.

Dr. Saffert located at New Ulm August 1, 1926, and has been associated with Dr. T. F. Hammermeister there to present time (1940). He was health officer for New Ulm from 1934 to 1937.

**Dr. L. A. Weissgeber**, a graduate of the University Medical School, Toronto, Canada, was associated with the Vogel and Seifert Clinic during the year 1928. He then moved to Northwest Canada.

**Dr. Fred H. Wiechman**, a graduate of the University of Minnesota Medical School, 1930, located in New Ulm in 1930, then the latter part of that year moved to Sleepy Eye where he engaged in the practice of medicine until 1935; thence to Fort Meade, South Dakota. Dr. Wiechman located in New Prague, Minnesota, in 1939.

**Dr. Howard A. Vogel**, a native of New Ulm, born February 2, 1907, graduated from the University of Minnesota in 1930. He took his premedical course at the University, then served on a rotating service at Detroit Hospital for eighteen months. He served an internship at Abbott Hospital for two years while attending the University of Minnesota; had a fellowship in medicine at the University of Minnesota for two years, and attended medical clinics in Europe. He located in New Ulm July, 1932, and has continued to practice there since that time.

**Dr. O. B. Fesenmaier**, born in New Ulm, September 23, 1907, was educated in New Ulm high school. He graduated from the Marquette Medical School in 1936, and served his internship at St. Ann's Hospital. He located in New Ulm the year of his graduation. He is the present secretary of the Redwood-Brown Medical Society.

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*Correction.*—The name of the physician appearing at the end of page 257 of the April issue should be Dr. W. G. Nuessle, instead of Muessle, as printed.

HOMEOPATHIC AND ECLECTIC MEDICINE IN MINNESOTA\*

By James Eckman†

Rochester, Minnesota

HOMŒOPATHIC PHYSICIAN.—*A Homœopathic Physician is one who adds to his knowledge of Medicine a special knowledge of Homœopathic Therapeutics and observes the Law of Similia.* All that pertains to the great field of medical learning is his, by tradition, by inheritance, by right.

EUGENE H. PORTER, M.D.—*Transactions of the American Institute of Homœopathy, 1889, pp. 57, 102.*

**D**URING the passage of some seventy years since Minnesota emerged from what might be called a frontier status, the contributions of homeopathy and homeopathic practitioners of medicine to the state have been largely forgotten. Yet homeopathy and its apostles played an important part in the history of Minnesota, not because the system of medicine itself was important, but because in many pioneer communities in the early years of the state the only physicians available were homeopaths. Moreover, a most provocative parallel could be formed if the gradual development and ascent of homeopathy in the United States were compared to the slow transition of the Territory of Minnesota from a status of virtual isolation to its emergence as a powerful and very nearly self-sufficient unit of the Federal Union. In chronologic aspects, the rise of homeopathy in the United States would be strikingly similar to the evolution of Minnesota as a state.

To the body of homeopathic practitioners of medicine who helped to found medical practice in Minnesota should be added the lesser body of eclectic physicians, many of whom were graduates of medical colleges, others of whom were merely herbalists of purely local renown, "steam doctors," physio-medical healers, naturopathic physicians and mechano-medical practitioners. Men such as these, who ventured into frontier homes and ministered to pioneer settlements from one end of the state to the other, were as necessary to the stricken prairie multitudes as were the well-trained metropolitan physicians and surgeons to their patients. Homeopathy and eclecticism contributed only a little to the great corpus of medicine as it is practiced today; both systems of practice were already senescent when the Twentieth Century began. Yet the practitioners who, however mistakenly, embraced and practiced homeopathy or eclecticism in the fifties, sixties and seventies in Minnesota were as truly pioneers as the men who came out from New England and the Atlantic Seaboard—from Harvard College, Yale College, the University of Pennsylvania, and other famous schools of medicine of the time—to settle in the somber and wildly beautiful reaches of a state in which the fearsome savage still roamed the bleak tundras and the deer and brown bear did not yet fear to show themselves near the outskirts of the frontier hamlets of forest and plain.

No consideration of either the virtues or the faults of homeopathy will be made in this paper; first, because the author is not qualified to do so; second, because such a consideration would have but very little validity if it were intruded into a study such as the present one. For the sake of historical per-

\*This study includes ancillary, and not essential, data in extended form which have been collated for a work in progress that is to be submitted to the Graduate School of the University of Minnesota, under the guidance of Richard E. Scammon, Ph.D., LL.D. This study does not represent either the final form or the final content of the aforementioned work.

†Division of Publications, Mayo Clinic.

spective, part of a paragraph by Fishbein<sup>1</sup> may be offered without affirmation or rejection of its conclusion:

... the influence of Hahnemann was, on the whole, certainly for the good. He emphasized the individualization of the patient in the handling of disease, he stopped the progress of half a dozen or more peculiar systems of treatment based on a false pathology, and he demonstrated the value of testing the actual virtues of drugs by trial. It is probably true that any criticisms which might be brought against him in the light of later and better knowledge apply equally well against a large part of the other medicine of his time.

More recently (1940), Guttentag<sup>2</sup> has suggested that homeopathy actually is "an integral part of the divisions of clinical medicine on the one hand and of pharmacology on the other." Guttentag also professed to have encountered instances of the increasing acceptance of homeopathic doctrines in contemporary medical practice.

### The Minnesota State Homœopathic Institute

Organization of the Minnesota State Homœopathic Institute\* in 1867 would appear to antedate formation of the Minnesota State Medical Society,† the *Transactions* of which are dated from the year 1870. But Armstrong<sup>3</sup> has shown that the Minnesota State Medical Society actually had been organized on July 23, 1853, and that it was *reorganized* on February 1, 1869, in Saint Paul. Dr. John H. Murphy (1826-1894) is known to have attended the seventh session of the American Medical Association at Saint Louis in May, 1854, as a delegate from the "Minnesota Medical Society,"<sup>4</sup> a circumstance which attests to the existence of an early "regular" medical society in Minnesota antedating the one which was said to have been "organized" in 1869.

The American Institute of Homœopathy is, however, older than the American Medical Association. It was founded in New York City in 1844,<sup>5</sup> whereas the American Medical Association was not founded until 1847.

An unidentified homeopathic physician<sup>6</sup> (probably Dr. William E. Leonard) has written of the Minnesota homeopathic organization:

Accordingly, at the "Globe Hotel," on the corner of Minnesota and Second streets in Saint Paul, these brethren of a persecuted faith met Feb. 14, 1867. This place was historical, for here had assembled the first legislature; and indeed, all prominent State enterprises in those early days had here their beginnings.

Sixteen homeopathic practitioners drew up the articles of federation for the institute, and these sixteen practitioners in later days came to be recognized by Minnesota homeopaths as the "sixteen apostles." It is not probable that there were many more than sixteen homeopathic physicians in Minnesota in 1867, for it was written that: "In the spring of 1867, the Homœopathists of Minnesota could count their brethren on their fingers."<sup>6</sup>

The sixteen homeopaths who signed the Articles of Association at the old Globe Hotel in Saint Paul were John Nutting Wheat, M.D. (1818-1903), of Minneapolis; E. Cooley, M.D., of Faribault; Charles Draper Williams, M.D. (1812-1882), of Saint Paul; E. A. Boyd, M.D. (1817-1888), of Saint Paul;

\*The diphthong *æ*, which in English reproduces the Latin spelling of the Greek combination of *omicron* and *iota*, was employed uniformly by homeopaths in almost all their literature. It has been retained in this study of official titles and in quoted material, but not in the text. It is interesting to note that Hahnemann himself used the expression *homœopathie*, and that the sententious *Edinburgh Review* (volume 50, pages 507 and 513) in 1830 repeated this Germanic form in preference to the English approximation of the Greek compound.

†The name "Minnesota State Medical Association" was not assumed until 1902, when the state medical organization was reorganized in accordance with the recommendations of the American Medical Association.

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T. N. Berlin, M.D. (1823-1911), of Farmington; Z. B. Nichols, M.D., of Faribault; T. Romeyn Huntington, M.D. (1829-1873), of Minneapolis; D. S. French (1812-1867), of Shakopee; Heinrich von Wedelstaedt, M.D. (1817-1900), of Saint Paul; William Caine, M.D. (1819-1867), of Stillwater; William Huntington Leonard, M.D. (1825-1907), of Minneapolis; Edward S. Warner M.D.; Philo L. Hatch, M.D. (1823-1904), of Minneapolis; William A. Penniman M.D. (1802-1872), of Minneapolis; Thomas Chatterton Schell, M.D. (1823-1883), of Saint Paul; and Sidney R. Wakefield, M.D. (1822-1916), of Monticello.<sup>6</sup>

Articles of Association for the Institute were filed in the office of the register of deeds of Ramsey County in Saint Paul on February 15, 1867. They were recorded by Jacob Mainzer (1834-1893), register of deeds, in "Book 'A' of incorporations, page 107." On the same date Secretary of State Henry C. Rogers (1834-1871) announced that the Articles of Association for the Institute had been filed in his office "according to law."

Curiously, the Minnesota State Homœopathic Institute was empowered to confer the degree of Doctor of Medicine on any or all of its members. Dr. Heinrich von Wedelstaedt of St. Paul, as will be shown, apparently received such a degree from the institute in 1867. This degree could be awarded to physicians "who may conform to its requirements. Eleven such were granted in the first years of its [the institute's] career, and several applicants for the same rejected. But since then the custom has tacitly fallen into desuetude, although it is still within the legal rights of the Institute. These privileges of a corporation will explain the presence among its honorary members of public men, as well as physicians."<sup>7</sup> The quotation was written in 1882. It would be most interesting to examine one of these old diplomas, if any exist today.

Mechanism for the granting of these diplomas was provided for in the constitution of the institute: members of the Board of Censors were to "examine carefully and impartially each student presenting himself as a candidate for license to practice medicine and surgery, and to report their opinion, in writing, with regard to his qualifications, to the President."<sup>8</sup> If a majority of the Board of Censors decided that the candidate should receive a diploma, he was to pay \$5.00 to the institute for it. In section 1 of the by-laws, however, the sum was stipulated to be \$25.00, a discrepancy not explained in the *Transactions*.<sup>8</sup> The licensing provision in the clause just quoted referred only to homeopaths; it was an aspect of internal regulation only. There was no state licensing act at this time in Minnesota.

Delegates to the annual sessions of the institute were to be chosen from county homeopathic medical societies and homeopathic medical colleges within the state, neither of which existed in Minnesota in 1867. Annual dues were one dollar.<sup>8</sup>

One year after the institute had been formed, two rather well-known American homeopaths were elected to honorary membership in the Minnesota body. One was Dr. Joseph H. Pulte<sup>9</sup> (1811-1884), a Westphalian by birth who in 1848 had conceived the idea of encircling the earth with a telegraph line, and who in 1852 founded the *American Journal of Homœopathy and Hydropathy*. In 1872 he helped to found the Pulte Medical College of Cincinnati, in which he served as professor of clinical medicine. The other was Dr. Gerhard Saal ( ? - 1873), one of the founders of the Pulte Medical College and its first professor of clinical medicine and hygiene.<sup>10</sup> One year later (1869) Dr. George Hadfield, a pioneer homeopathic practitioner of Saint Paul who had returned to Cincinnati, was made an honorary member of the institute.



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In 1868 the Committee on the Seal of the Institute reported that a seal had been decided upon: "It being the Coat of Arms of the State of Minnesota, surrounded by the words Minnesota State Homœopathic Institute with the date of organization."<sup>11</sup> The writer has never seen this seal, and does not know that it was ever engraved.

A brief chronicle of homeopathy in the United States prior to 1867 was presented by Dr. Henry Hutchinson<sup>12</sup> (1849-1910) of Saint Paul in his presidential address before the Minnesota State Homœopathic Institute in 1884:

Glancing over the history of our school in the United States, we find that less than sixty years ago the first practitioner of homœopathy settled in New York City. To the late Dr. H. B. Gram belongs this honor.

An American by birth, but of Danish descent, Dr. Gram became a disciple of Hahnemann while practicing medicine in Copenhagen and returned to this country a homœopath in 1825. From this beginning, the advance in the United States was as follows: In 1828 there were two homœopathic physicians; in 1830, six; in 1832, eleven; in 1834, thirty-three, and in 1835, fifty-seven.

In 1866 we find the number increased to three thousand three hundred and fifty, a most wonderful rate of increase. From New York and Philadelphia, westward and northward, has the tide of our increasing numbers swept, keeping pace with the development and peopling of the country.

First president of the Minnesota institute was Dr. William A. Penniman (1802-1872). In his presidential address at the Globe Hotel on June 4, 1867, Penniman struck out at "the errors and mischievous practice of the 'orthodox school,' which has been permitted to control the opinion of the world for centuries," and then proceeded to explain the *credo* of the homeopath:

*The totality of the symptoms alone representing the disease.* In them he has a guide that may be depended on, and when these are destroyed, he may be certain that the disease is removed; and the true and rational way to do this, is to give a medicine that will produce symptoms similar to the disease. It follows, therefore, that the disease cannot be radically cured, but by a medicine that will produce the entire group of symptoms presented by the disease. . . The great object to be obtained is to have a factitious disease in your mind that resembles the one you wish to cure, selecting *one remedy*, if possible, that covers the entire symptoms of the disease.<sup>13</sup>

Dr. Penniman did not long survive his inaugural address as president of the institute. He died on March 10, 1872, at Elizabeth, Pennsylvania, and in his will he left the sum of \$30,000 which was to be used for the construction of the "Penniman Homœopathic Hospital of Minneapolis." The terms of this will were so confusing that legal aid had to be sought at once, after which it was ascertained that before the sum of \$30,000 could be obtained from the estate, the homeopathic physicians of Minneapolis and the vicinity would have to raise an additional sum of \$70,000 within a period of fourteen years from the date of bequest. Such a subscription was a formidable prospect in Minneapolis of the seventies, but as if it were not enough of a barrier, Penniman's sister, to whom most of his estate had been given, announced that even if the stipulated \$70,000 were accumulated, she would not release the \$30,000 without a battle in court. Accordingly, in 1876, all hopes of utilizing the Penniman bequest were banished. Dr. Penniman had also declared that the sum of \$10,000 with accrued interest was to be taken from his estate and used to endow a chair of homeopathy at the University of Minnesota while his surviving colleagues were collecting the required \$70,000, but this was never done, so far as is known. Foundation of the University of Minnesota College of Homœopathic Medicine and Surgery in 1888 was not the result of any provision in Dr. Penniman's will.

An interesting fragment dealing with the history of regulation of medical practice in Minnesota is contained in the historical sketch<sup>6</sup> with which the first volume of the *Transactions* of the institute opens. It would appear that attempts were made by the homeopaths in 1870, 1875 and 1880 to secure passage of an act to regulate medical practice in Minnesota. The attempt of 1880 was centered in an act which was said to have been accepted by both allopathic and homeopathic physicians, and this bill was passed by the Senate. On March 1, 1881, however, the Capitol in Saint Paul burned, and the resultant confusion prevented the bill from being acted on by the House of Representatives.

In 1875, however, a bill was passed which provided that all legally constituted medical colleges or associations within the state could claim for purposes of dissection the bodies of persons buried at public expense, provided that such bodies were not claimed by relatives. (*General Statutes of 1875*, Chapter 124, Sections 36, 7, 8, 9.) It was implied in the historical sketch referred to that homeopaths had helped to pass this bill.<sup>6</sup>

Some of the addresses delivered before the Minnesota State Homœopathic Institute contained much hard-headed practical advice. Dr. A. A. Camp<sup>14</sup> (1854-1888), in his presidential address (which he entitled "The Physician's Heart vs. his Bank Balance") before the institute in 1886 counseled his colleagues:

Having collected two-thirds instead of one-third of your bills, you will soon have a surplus of spending money. Now Dr. Cathell\* recommends that you spend your money in a showy office and handsome livery, a skeleton or two for your office to show your skill in anatomy, a fibroid tumor in glass to show your skill in ovariectomy, and a few dozen tape worms in bottles to show that you can get the bodies, whether the heads remain or not. This may be good advice for Baltimore, but it won't do out here. Invest your surplus money in lands is my advice. Some prefer acres and farms, some prefer city property, some prefer ten per cent notes or mortgages. Any of them are good, if selected with care, and properly bought, and there is variety enough to satisfy all kinds of minds. And it makes all the difference in the world whether you are owing ten per cent or are receiving it.

On the other hand, much unrelenting invective was freely poured forth at annual sessions of the state organization. In 1881, Dr. Charles W. Crary<sup>15</sup> (1835-1905) of Lake City said contemptuously in his presidential address before the institute:

What would the gold-headed staff so pompously carried by Radcliff [*sic*], Meade [*sic*], Atken [*Askew?*] Baill [*sic*]; and then deposited with the English College of Physicians; say, could it speak for its degenerate successors?

Dr. George H. Hawes<sup>16</sup> (1832-1892) of Hastings was more gentle in his opinion of the "regular" school; in his presidential address before the institute in 1883 he remarked:

I would not detract anything from the honors our friends of the opposing school have won in the collateral branches of medical science. We would accord them full credit for the reflected light we have absorbed from their researches in all departments, save that of therapeutics. In therapeutics they stand where Hahnemann stood one hundred years ago.

Study of the *Transactions* reveals the rather ironic fact that the "regular" medical journals were thoroughly searched for evidence that so-called allopathic

\*Daniel Webster Cathell, M.D. (1839-1925), once professor of pathology in the College of Physicians and Surgeons of Baltimore, in 1882 wrote a book called *The Physician Himself*; in this book and in subsequent editions of it he attempted to point out how the physician should conduct himself and his professional duties and how he should safeguard his economic status.

physicians were using homeopathic drugs and homeopathic methods of therapeutics. If the search was productive, the validity of homeopathy was said to be established, thereby, in allopathic hands.

Yet the relationship between the Minnesota State Homœopathic Institute and the Minnesota State Medical Society seems to have been amicable. In 1883 Dr. Camp, who was treasurer of the institute, announced that he had sent one copy of his organization's *Transactions* to the Office of the Surgeon-General in Washington and one copy to the Minnesota State Medical Society. He reported that the secretary of the latter body had replied by sending to him a copy of its *Transactions* in exchange.<sup>17</sup>

Dr. Charles N. Hewitt (1836-1910), from 1872 to 1897 secretary of the Minnesota State Board of Health and Vital Statistics, spoke before the thirtieth meeting of the Minnesota State Homœopathic Institute at Minneapolis in 1896, and apparently was received with admiration and respect.<sup>18</sup> There is nothing in Dr. Hewitt's long and distinguished career to suggest that he was impressed by any of the doctrines of homeopathy, but his unfailing courtesy and innate sense of fairness would have forbade his being anything but tolerant of homeopathic physicians.

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(To be continued in the July issue.)

## EDITORIAL

### MINNESOTA MEDICINE

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BUSINESS MANAGER  
J. R. BRUCE

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#### THE STATE MEETING

IN spite of humid weather, dotted by showers,  
the eighty-eighth annual session of the Minne-  
sota State Medical Association had a successful  
termination. The official registration of phy-  
sicians was 1651.

The following officers were elected for 1942  
by the House of Delegates: President-Elect,  
Dr. H. Z. Giffin, Rochester; First Vice President,  
Dr. N. H. Baker, Fergus Falls; Second Vice  
President, Dr. S. B. Haessly, Faribault; Secre-  
tary, Dr. B. B. Souster, Saint Paul (reëlected);  
Treasurer, Dr. W. H. Condit, Minneapolis (re-  
elected); Speaker of the House, Dr. W. W. Will,  
Bertha (reëlected); Vice Speaker of the House,  
Dr. E. A. Meyerding, Saint Paul (reëlected);

Councilor First District, Dr. L. A. Buie, Roch-  
ester; Councilor Second District, Dr. L. L. Sogge,  
Windom (reëlected); Councilor Ninth District,  
Dr. F. J. Elias, Duluth (reëlected).

Dr. S. H. Baxter, Minneapolis, was elected  
to fill the unexpired term of Dr. C. A. Stewart,  
Minneapolis, councilor of the Sixth District, re-  
signed because of his departure to take a posi-  
tion with the Louisiana State University.

*A.M.A. Delegates.*—Dr. Frank J. Savage,  
Saint Paul; Dr. A. W. Adson, Rochester (to fill  
Dr. Braasch's unexpired term); Dr. James M.  
Hayes, Minneapolis.

*A.M.A. Alternate Delegates.*—Dr. George Earl,  
Saint Paul; Dr. W. W. Will, Bertha.

The Distinguished Service Medals were pre-  
sented this year to Dr. C. M. Jackson, Minne-  
apolis, and Dr. L. L. Sogge, Windom, for their  
outstanding services to the profession of Minne-  
sota. The award of the medal to the late  
Charles Benjamin Wright of Minneapolis was  
confirmed by the House of Delegates.

The 1942 meeting will be held in Duluth at a  
time to be designated by the Council.

#### THE COMMITTEE ON MEDICAL TESTIMONY

DURING the recent meeting of the Minnesota  
State Medical Association your Committee  
on Medical Testimony conducted its first in-  
vestigation. The complaint was submitted in  
writing to the Committee. A careful study was  
made of the entire medical testimony, the hospi-  
tal record, and the x-ray plates. The Committee  
obtained valuable assistance from four special-  
ists, qualified in the particular fields of medicine  
involved in the case under investigation. Your  
Committee wishes to express its appreciation to  
these four physicians who so willingly gave of  
their time, their knowledge, and their experience  
in order that an honest and unbiased opinion  
could be reached. The full coöperation of every  
member of the Minnesota State Medical Associa-  
tion is necessary in order to maintain the highest  
type of medical testimony in the courts of this  
state. Medical societies from neighboring com-  
munities are greatly interested in the program  
of this Committee and several inquiries have been  
received.

—E.M.H.



## AMERICAN BOARDS

THE whole subject of specialism in medicine is rather a complex one, and our main purpose in dwelling on the subject at all is to explain the steps that have been taken in the standardization of the specialties.

Until comparatively recently a specialist was one who admitted he knew a lot about a limited phase of practice. If he was mistaken, his confreres soon found it out even if the public proved itself somewhat slower in the discovery.

This was a haphazard way of separating specialists from general practitioners, and yet it seemed to work out fairly well. With the enormous advances in medical science the need for specialism became more essential and the desirability of some method for certification of specialists became more apparent. Who were better suited to certify specialists than the profession itself?

Thus, Boards for establishing minimal standards and educational requirements, and for certifying individuals as specialists, came into being. The American Board of Ophthalmology created in 1916 was the first one to be established. In 1924 came the American Board of Otolaryngology and in 1930 the American Board of Obstetrics and Gynecology. Up to the present time thirteen American Boards have been established for certification in as many specialties. The appointment of these Boards has been kept in the hands of the profession. At first there was no reason why any self-designated group could not call themselves an American Board. It was early apparent that it was desirable that a Board have the official approval of the national society in that specialty, and of the section of that specialty in the American Medical Association. In order to coordinate the work of the several boards and to avoid duplication of effort, an Advisory Board for the medical specialties was formed in 1933, consisting of two members from each of the American Boards so far established, and representatives from groups primarily interested in medical education, such as the Association of American Medical Colleges, the American Hospital Association, the Federation of State Medical Boards and the National Board of Medical Examiners. The purpose of this Advisory Board is to endeavor to coordinate the common interests of the various Boards and to establish standards for new Examining Boards. The

same year the House of Delegates of the American Medical Association authorized the Council on Medical Education and Hospitals to formulate standards for Boards and to officially recognize new Boards meeting these standards, and receiving the recommendation of the Advisory Board of Medical Specialties.

Thus the mechanism has been set up for the establishment of Boards representing the specialties and receiving the official approval of the Council on Medical Education and Hospitals of the A.M.A.

Certification by one of these Boards means that an individual possesses certain minimal educational and other requirements which entitle him to be called a specialist. The whole undertaking has been subjected to criticism. Boggs\* was critical of so much standardization of medical qualifications as applied especially to internal medicine. He felt that examinations and evidence of courses followed cannot determine whether one is an internist or not and that an internist's recognition "rests upon the consensus of opinion of his professional colleagues and trainers." He believes internists should obtain their training in a variety of ways rather than that all should be turned out in the same mold. He sees a danger of too much power in the hands of these Boards over hospitals and medical schools. Already hospitals, and perhaps next medical schools, may be requested to appoint only certified individuals to leading positions in the various departments. He fears, in short, that there is danger that too much power may eventually get into the hands of a bureaucrat incapable of judging or evaluating justly.

These Boards have doubtless increased the quality and number of facilities for graduate training in the United States and have in this way been of additional value. The recent publication of a Directory of Medical Specialists by the Advisory Board of Medical Specialties, containing the names of those certified by the various Boards, is valuable for reference.

The Boards should all be meticulous in carrying out their functions so that certification is limited to those qualified by training and from an ethical viewpoint. It is just as important that eligible candidates be not denied certification because of personal dislike or hasty judgment depending on hearsay.

\*Boggs, T. R.: Regimentation in medicine. *Trans. Assn. Am. Phys.*, 52:1, 1937.

# MEDICAL ECONOMICS

Edited by the Committee on Medical Economics  
of the

Minnesota State Medical Association

George Earl, M.D., Chairman

## CONTRIBUTE NOW

The scientific advancement of medicine has always outstripped the development of its public relations. That this should be so is no reflection upon the leaders of medicine.

It is well known that skill in public relations does not necessarily guarantee excellence in the product or organization promoted.

Organized medicine has been backward in this matter because physicians conceived of themselves as doctors and humanitarians. They felt that their work could speak for itself.

Obviously such an attitude has proved impractical in a world which runs on a balance of power between propagandists and pressure groups.

The National Committee of Physicians, now almost two years old, has gone a long way forward in the work of doing for medicine what county and state societies and the American Medical Association were not organized to do for themselves.

Never has an organization had such magnificent propaganda material to work with, such a sound and well-trying idea to sell. There is no reason why the accomplishments of medicine in America should not be known and valued at every cross road. There is no reason why its work should be halted now, by government regulation—unless the support of the physicians themselves is lacking for this essential task.

Only a relatively small sum is needed from each individual physician provided all do their part; but that sum is needed now. Otherwise the whole effort will have proved to be "too little and too late."

Contributions should be sent at once to the National Committee of Physicians, Dr. F. J. Savage, chairman of the Minnesota Division, Saint Paul.

## NEW STATE PROGRAM

An experiment which may prove to be the historic turning point in the control of human tuberculosis got under way under auspices of the Committee on Tuberculosis in Meeker county last month.

That the undertaking may also strengthen further the public position of organized medicine in Minnesota is shown by the widespread lay interest in the project.

No self-interest can be charged to physicians who are giving both their time and their funds to such forward looking measures for human welfare.

### Meeker County Plan

The Meeker county plan calls for the tuberculin testing of every man, woman and child on a county-wide basis. It is this area basis instead of group basis which makes the plan unique and puts it on the road to the same brilliant effectiveness that has attended the area testing of cattle in this country.

### Farmers Interested

The interest of Meeker county farmers who engaged in the first bitter fight for area testing of cattle herds is keen and well informed. They remember well the difficulties they encountered as pioneers in the campaign to rid cattle of tuberculosis. They are intensely proud of that campaign and of their part in it and this projected extension of essentials of the plan to the human population seems to them both logical and desirable.

The result is likely to be a general and enthusiastic response on the part of all the people in Meeker county. Tuberculin tests and x-ray examinations of reactors will be given without charge for the period, estimated at two years, of the experiment. Meeker county physicians will give their time and services to the project for

this period and funds for x-rays have been appropriated by the Council of the state association.

## One of Several

This Meeker county plan is only one of several public projects now under way under Minnesota State Medical Association sponsorship for improvement of health and the control of disease in Minnesota. It has a dramatic quality, however, which has caught public attention and which will not fail to establish in the minds of many people the fact that physicians are banded together for the public good and that their counsel can be trusted.

## Doctors in Court

Reports to be presented to the House of Delegates of the association, which is in session as this issue goes to press, show an expansion of the association's program in many directions. One of these is in the direction of the discipline of members and this, also, has attracted interest and approval in many quarters where criticism was not unknown before. It takes the form of the first organized attempt made by medical men anywhere in the United States to tackle the problem of false medical testimony in the courts. With Council approval, a Committee on Medical Testimony was formed last year which was designed to undertake an impartial study of every case where there is reason to doubt the honesty of a physician in the rôle of expert witness. If the committee finds, after careful investigation, that the physician is, in fact, guilty of deviating deliberately from the truth, the whole matter will be submitted to the State Board of Medical Examiners for whatever disciplinary action the latter body sees fit.

## Invitation Issued

A special invitation was issued to judges of the district courts of Minnesota to report such cases for investigation. Physicians or other responsible persons are also free to report to the committee. No attempt will be made, of course, to interfere in cases of honest difference of opinion. In rare cases where so-called experts have differed in matters that admit of no reasonable differences, the resulting public scandal has reflected on the entire medical profession. Such cases are likely to be even rarer by reason of the mere existence of this committee. Response

of leading judges of Minnesota to the plan was immediate and cordial.

## Community Immunization

Another association project for the year was directed toward coördination and complete coverage over the entire state of community immunization and vaccination programs.

The complete elimination of smallpox and diphtheria obviously awaits only the time which vaccination and immunization can be extended thoroughly to the children of every community. Such an extension, where the work has not already been established, could be done easily by state agencies. For the sake of the people themselves and for the sake of the profession which can ill afford to leave such routine public health measures to an advancing system of government medicine, all such measures should be done under local sponsorship by community physicians.

## Budget Outstripped

The appeal to all county and district medical societies to complete and establish this work on a routine basis in their own communities was made last fall by the Council and the Committee on Vaccination and Immunization. A packet of helpful material which included all essential information as to techniques, organization and promotion was sent to all county advisory committees, county officers and county nurses as aids to the work. The result was that new programs were started in no less than 35 counties and the demand for vaccine and toxoid from the State Board of Health for the first time all but outstripped the appropriation in the budget of the State Board of Health.

## Hoary Epithet

It is clear that the hoary epithet "medical trust" with all its connotations will never stand up in the court of public opinion so long as the organization of physicians is identified in the public mind with such sound movements to protect the public health and promote the public welfare.

## New Exhibit

In that connection it should be noted that an attractive public exhibit with sixteen colored slides which show achievements of medicine in

Minnesota in the last hundred years, is to have its first showing to doctors at the St. Paul meeting. The exhibit will be available for showing at other lay meetings this year.

### "COMPLETELY OUT OF PATIENCE"

Physicians in San Francisco are reported to be feeling the crack of the politicians' whip with the result that hundreds of them have resigned in protest from the Municipal Employees' Health Service System. The following account of the action of the physicians appeared in the *San Francisco Examiner* on March 28. The Municipal Health Service was started some years ago and its success, to date, has largely been due to the coöperation in the face of constant difficulties by the medical society and its members. The action of the Board is regarded in San Francisco as advance evidence of what would certainly happen if health insurance were made compulsory and run by politicians.

San Francisco physicians began resigning from the Municipal Employees' Health Service System by hundreds yesterday in protest against the "capricious and arbitrary actions" of the system's board of directors.

Simultaneously, the board heaped new fuel on the fire by failing to approve the January fees to physicians serving the system—the failure resulting from the fact that only three out of eight directors responded to President Cameron King's summons to a special meeting to act on the matter.

The wholesale resignations which poured in throughout yesterday protested specifically the board's failure to keep its promise to effect a new system of fees. They were conditional resignations, but were submitted with the understanding that they would become final if the board failed to get the new schedule into action within "a reasonable time."

The County Medical Society had suggested that the physicians employ this means of acquainting the board with their determination to procure action, and the hearty response brought this comment last night from Dr. L. Henry Garland, society secretary:

"This tremendous flood of conditional resignations received within thirty-six hours after the society suggested this form of protest is proof the doctors serving the system are completely out of patience with the board's capricious and arbitrary actions.

"The board's actions themselves are proof of what is to be expected when health insurance is made compulsory and turned over to politicians."

### MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

J. F. Du Bois, M.D., Secretary

Former Saint Paul Chiropractor Fined \$250.00 for Illegal Practice of Healing.

Re: State of Minnesota vs. Peter J. Stolurow, also known as Dr. Stoll

On May 19, 1941, Peter J. Stolurow, forty-six years of age, entered a plea of guilty in the District Court of Ramsey County to an information charging him with



the crime of practicing healing without a basic science certificate and was fined \$250.00 by Judge Hugo O. Hanft. Stolurow, who operates an orthopedic shoe store at 16 W. 6th Street, Saint Paul, was arrested on May 8, 1941,

following an investigation by the Saint Paul Police Department and the Ramsey County Attorney's office of the circumstances surrounding the abandonment of a six-day-old baby on the doorstep of the Salvation Army's Booth Memorial Hospital. This investigation disclosed that Stolurow had made a physical examination of a young married woman for the purpose of determining the duration of her pregnancy. The mother of the child stated that she went to Stolurow for the purpose of having an abortion performed and that he wanted \$350.00 to perform it. This is denied by Stolurow but he admitted making the examination. He also admitted receiving \$113.00 from the parents of the child, which he claimed was for the purpose of placing the child in a home for six months, at which time the child was to be returned to the parents. The child was born on May 1, 1941, at Samaritan Hospital and was removed from the Hospital on May 6, at which time it was left on the doorstep of Salvation Army's Booth Memorial Hospital by Stolurow.

On May 19, 1941, Stolurow also entered a plea of guilty in the District Court of Ramsey County to an information charging him with endangering the life and health of a minor, and was sentenced by Judge Hugo O. Hanft to a term of one year in the Saint Paul Workhouse. Stolurow was immediately taken to the Workhouse to commence his sentence. A charge of grand larceny in the second degree against Stolurow in connection with his obtaining the \$113.00 was dismissed on motion of the County Attorney, after Stolurow had pleaded guilty to the other two charges.

Stolurow has a record of two previous convictions for criminal offenses, one in 1928 for the crime of abortion, at which time he was sentenced to a term of not to exceed four years in the State Prison at Stillwater. He served that sentence, but in 1935 he again became involved in a similar case and was permitted to plead guilty to a charge of practicing medicine without a license and was given a suspended sentence of one year in the Saint Paul Workhouse. Stolurow was formerly licensed to practice chiropractic and chiropody in the State of Minnesota, but had his chiropractic license revoked in 1929, following his conviction for abortion, and in 1935, his chiropody license was revoked as well as his basic science certificate.



## REPORTS and ANNOUNCEMENTS

### CENTRAL ZONE CONFERENCE AMERICAN SOCIETY FOR THE HARD OF HEARING

The third biennial Central Zone conference of the American Society for the Hard of Hearing will be held at the Nicollet Hotel in Minneapolis, June 26, 27 and 28.

Of particular interest to medical men and medical social workers is the scientific session to be conducted at 2:30 p.m., June 26. Dr. Horace Newhart, director of the Division of Otolaryngology at the University of Minnesota Medical School and a member of the society's board of directors, is chairman of the scientific session and will preside.

The program for this session follows:

"The Hard of Hearing—A Neglected Problem"

Gaylord W. Anderson, M.D.

Professor of Preventive Medicine and Public Health,  
University of Minnesota

"The Problems of the Hard of Hearing in Industry"

William E. Grove, M.D.

Professor of Otolaryngology, University of Marquette  
Medical School, Milwaukee

"The Alleviation of Certain Cases of Chronic Hearing  
Impairment by Surgical Reconstruction of the Con-  
ducting Mechanism" George S. Shambaugh, Jr., M.D.

Associate Clinical Professor of Otolaryngology,

Rush Medical School, Chicago

"Diseases of the Upper Air Passages as Causes of  
Hearing Deficiencies".....Lawrence R. Boise, M.D.

Associate Professor of Otolaryngology, University of  
Minnesota Medical School

"Problems Associated with Hearing Surveys"

Warren H. Gardner, Ph.D.

Consultant Hearing Vision, Division of Maternal and  
Child Health, Oregon State Board of Health  
Question Box on Hearing Problems.

These papers will be supplemented by discussions to  
be opened by prominent scientific men.

Another medical man taking part in the program is  
Dr. Thurman B. Rice, chief of the Bureau of Health  
and Physical Education of Indiana, who will speak at  
the opening session, the morning of June 26.

### NU SIGMA NU FRATERNITY

The fiftieth anniversary of the founding of the Minnesota chapter of Nu Sigma Nu, medical fraternity, was noted April 26 with a banquet at the Minnesota Club in Saint Paul. Approximately 150 persons attended.

Dr. W. P. Larson, head of the department of bacteriology at the University of Minnesota Medical School, was toastmaster.

Principal speaker was Dr. James Trent Christison of Saint Paul, a charter member of the Minnesota chapter. Other speakers were Dr. Stuart Graves, of Tuscaloosa, Alabama, dean of the University of Alabama School

of Medicine and secretary of the national organization of Nu Sigma Nu; Dr. Donald C. Balfour of Rochester, director of the Mayo Foundation and president of the honorary council of the national organization; and Fred W. Gaarde of Rochester, newly elected president of the active chapter.

In addition to Dr. Christison, there are two other charter members of the Minnesota chapter living. They are Dr. E. Sydney Boleyn of Stillwater and Dr. George E. Senkler of Saint Paul. Neither was able to be present at the banquet.

### MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

The Minnesota Academy of Ophthalmology and Otolaryngology conducted a meeting in Rochester, May 9. Following a luncheon at the Mayo Foundation House, a scientific program was conducted at the Mayo Clinic. Papers were presented by Drs. K. M. Simonton, G. B. New, Grace Roth, C. L. Yaeger, H. J. Moersch, and Edith Parkhill.

### MINNESOTA SOCIETY OF INTERNAL MEDICINE

The bi-annual meeting of the Minnesota Society of Internal Medicine was held in Minneapolis, May 17, at the Hennepin County Medical Society rooms. Scientific sessions were conducted in the morning and afternoon.

Guest speaker at the banquet in the Minneapolis Club was Dr. W. J. Luyten, professor of astronomy at the University of Minnesota.

Dr. Max Hoffman of Minneapolis is president of the society; Dr. Cecil J. Watson, vice president; and Dr. Reuben A. Johnson, secretary.

### HENNEPIN COUNTY MEDICAL SOCIETY

The election of Dr. Edward J. Huenekens of Minneapolis to the presidency of the Hennepin County Medical Society is announced. Dr. Huenekens will take office October 7, and will succeed Dr. R. W. Morse, who will become chairman of the executive committee.

Other officers who will be installed with Dr. Huenekens are: Dr. Willard D. White, first vice president; Dr. Charles E. Proshek, second vice president; Dr. William R. Jones, secretary-treasurer, and Dr. Henry L. Ulrich, librarian.

Named to committees and boards were: Dr. James A. Johnson and Dr. James S. Reynolds, executive committee; Dr. Stephen S. Baxter and Dr. Erling W. Hansen, board of trustees; Dr. Charles R. Drake and Dr. Norman Johnson, board of censors; and Dr. Huenekens and Dr. A. H. McFarland, ethics committee.

## IN MEMORIAM

### SAINT PAUL CLINICAL CLUB

Dr. Edward Churchill of Boston, professor of surgery at Harvard Medical School, addressed a dinner meeting of the Saint Paul Clinical Club, May 24, at the Minnesota Club. His subject was "Experiences with Resection of the Esophagus for Carcinoma."

Dr. John E. Holt, president of the club, presided. Chairman of general arrangements was Dr. Max W. Alberts.

### OLMSTED-HOUSTON-FILLMORE-DODGE COUNTY MEDICAL SOCIETY

The general staff of the Mayo Clinic and members of the Olmsted-Houston-Fillmore-Dodge County Medical Society joined together for a meeting, May 7, in the Mayo Foundation House at Rochester. Dr. A. F. Risser of Stewartville and Dr. F. M. Feldman of Rochester gave reports on lectures on pediatrics recently given at the University of Minnesota and a motion picture, "When Bobby Goes to School" was shown.

## In Memoriam

### Paul Dee Berrisford

Dr. Paul Dee Berrisford, one of the well known ophthalmologists of Saint Paul, died April 17, 1941, at the age of fifty-six after a four years' illness.

Dr. Berrisford was born December 2, 1884, in Saint Paul, the son of Mary E. and Paul J. Berrisford, Saint Paul pioneers. He attended the public grade schools and Central High School. He graduated from the University of Minnesota Medical School in 1912. After serving his internship at Ancker Hospital in 1912-1913 he went to Vienna in 1913 for postgraduate study and was there at the outbreak of the World War. In September, 1914, he went to London and took a course in ophthalmology at Moorfields Royal London Ophthalmic Hospital, serving at the close of the course as a junior assistant at the hospital for six months. Upon his return to the United States he took further study in nose and throat work at the Postgraduate College of New York City, where he remained eight months. He then returned to Saint Paul, where he practiced his specialty continually until four years ago.

Dr. Berrisford was assistant professor of ophthalmology at the University of Minnesota, he was a member of the Minnesota Academy of Ophthalmology, a fellow of the American College of Surgeons, a member of the Alpha Kappa Kappa medical fraternity, and a member of the Ramsey County Medical Society, the Minnesota State and American Medical Associations. He was also a member of the staffs of Saint Luke's Hospital, Miller Hospital, Children's Hospital and Saint Joseph's Hospital. For twenty-five years he served in the eye department of the Wilder Dispensary.

In 1949, Dr. Berrisford married Geraldine Kilty. She and two children, Geraldine and Paul Dee, Jr., survive, as well as his mother.

Dr. Berrisford had a fine musical education and possessed a fine baritone voice. Music was his hobby and true enjoyment of it his passion. He possessed a keen sense of humor and an indomitable courage which he maintained in spite of a long period of ill health.

### Charles Wesley Pettit

Dr. Charles W. Pettit was born in Fillmore, Fillmore County, Minnesota, on October 29, 1878. He graduated from the Preston High School in June, 1895, and taught school from 1895 to 1897 at Cherry Grove, Minnesota. He attended Carleton College and Hamline University, then the University of Minnesota Medical School, graduating in 1903.

He started the practice of medicine in Byron, Minnesota, in June, 1903, and a year later moved to Minneapolis, locating in an office over King's Drug Store at 12th Street and 3rd Avenue South (the present site of the Vocational High School).

In November, 1903, he married Lina Seith, of Northfield, Minnesota.

In 1916, he moved to the Physician's and Surgeon's Building, there being associated with Dr. Louis A. Nippert. He was on the Staffs of Hillcrest and of Old Asbury Hospitals, and later of the New Asbury Hospital.

About 1919, he formed a partnership with the late Dr. E. K. Green; later on, Dr. Leonard K. Buzzelle was made a member of this group.

He was secretary of the Hennepin County Medical Society in 1918, 1919 and 1920.

In 1938 he established offices with his son, Dr. Paul S. Pettit, dentist, at 704 Physician's and Surgeon's Building, and was there in active practice at the time of his death.

He was a member of the Scottish Rite and the Shrine, of the Minneapolis Professional Men's Club, and of the Hennepin Avenue Methodist Church.

On February 9, 1941, while on his return from a vacation in California, he was stricken with coronary thrombosis and passed away at St. Mary's Hospital, Kansas City, Missouri, on February 25, 1941. Burial was at Oaklawn Cemetery, Northfield, Minnesota.

He was a physician of the highest type, devoted to his practice and his family, a capable counselor to his patients.

He is survived by his wife, Lina S. Pettit; two daughters, Mrs. Bernard C. Grangaard (Mary Pettit) of Windom, Minnesota, and Mrs. Peter Van Hoose, Jr. (Ruth Pettit) of Minneapolis; and two sons, Dr. Charles A. Pettit and Dr. Paul S. Pettit, both of Minneapolis; and two grandchildren, Robert Grangaard and Charles Pettit, Jr.

A. H. McFarland, M.D.

MINNESOTA MEDICINE

## TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

Joint Meeting with Hennepin County Medical Society, Monday, January 6, 1941

### War Symposium on the Surgery of Trauma

The annual all-day joint meeting of the Minneapolis Surgical Society and the Hennepin County Medical Society was held on January 6, 1941.

The following program was carried out at the Minneapolis General Hospital under the supervision of Dr. A. A. Zierold:

Injuries to the Cervical Spine—Willard White, M.D.  
Cranio-Cerebral Tumors—O. J. Campbell, M.D.

Shock in Trauma—E. J. Welte, M.D.

Crushing Injuries to the Elbow—E. C. Henrikson, M.D.

Sepsis of the Knee Joint—John Pohl, M.D.

Crushing Injuries of the Pelvis—G. D. Eitel, M.D.

In the afternoon a meeting, presided over by Dr. Arthur Bratrud, was held and the following papers were given:

Treatment of War Wounds based on their Bacteriology—T. H. Sweetser, M.D.

Trauma to the Hand—K. E. Fritzell, M.D.

Reconstruction of the Hip—John M. Moe, M.D.

Injuries to the Ear, Nose and Throat—L. R. Boies, M.D.

Emergency Tourniquet Amputation—S. R. Maxeiner, M.D.

Penetrating Wounds of the Chest—T. J. Kinsella, M.D.

Immediate and Early Skin grafting—H. O. McPheeters, M.D.

In the evening at 8:00 P. M., the combined Societies and visiting physicians were addressed by Dr. Fraser B. Gurd on the following subject: "The Treatment of Gunshot Wounds, with Special Reference to Modification of Rutherford Morrison's Bipp Method."

### COMMUNUTED FRACTURES ABOUT THE ELBOW JOINT

EARL C. HENRIKSON, M.D.  
*Minneapolis*

A series of comminuted fractures involving the bones about the elbow joint were demonstrated.

The first patient had a fracture of the ulna with a dislocation and fracture of the head of the radius. Through a posterior approach the ulna was plated and the fragments of the head of the radius removed. A fascial strip was placed around the neck of the radius to maintain it in position.

The second patient had a comminuted fracture of the head of the radius with a dislocation of the ulna. The fragments were removed at open operation after reduction of the dislocation. Both these patients have practically full range of motion.

In the third patient the articular surface of the lower end of the humerus had been sheared off parallel to the shaft by a fall on the out-stretched arm. The fracture was reduced through a lateral incision and remained in place without internal fixation.

The fourth patient was a comminuted Y- or T-fracture in which there was perfect reduction through a posterior incision. The operation used was that described by Dr. George W. Van Gorder of the Fracture Service of the Massachusetts General Hospital. The procedure is described in the April, 1940, issue of the *Journal of Bone and Joint Surgery*.

Open reduction means more perfect reduction, internal fixation means better immobilization and hence more rapid healing and earlier active and passive motion. Consequently the patients have less stiffness and disability.

### SEPSIS OF THE KNEE JOINT\*

JOHN F. POHL, M.D.  
*Minneapolis*

In civil as well as in military life, injuries and infections of joints offer a constant threat to the well-being, the physical integrity, and even the life of individuals exposed to trauma. The knee joint, by virtue of its position, is especially vulnerable to injury. It was estimated in the World War that the knee joint was involved in 3 per cent of all war wounds. Furthermore, of all joints affected, the knee suffered in 33.3 per cent of the cases.

The World War offered a considerable experience in violence to the human body. Most surgeons dealing with battle casualties were deeply impressed with the tragic results of knee wounds and the concomitant infection usually suffered. From this experience a number of valuable lessons were well learned, which were directly applicable to civilian medicine. The first was that the joint synovia, formerly thought to be highly susceptible to disease, really has remarkably good power of combatting potential infection. For instance, a plain high velocity rifle bullet entering or passing through the knee offered a 90% chance that there would be no serious result to the knee even if the wound received no more than a simple dressing. In fact, of all wounds of the knee, including those grossly shattered and contaminated, regardless of the method of treatment, only about 25% became actually infected.

It is this 25% of the knee wounds which become

\*From the Department of Orthopedic Surgery, Minneapolis General Hospital.

infected however, which threaten the integrity and life of the patient and offer the surgeon a grave problem in treatment. At the beginning of the World War it was considered inevitable that infection meant a stiff knee, loss of the limb, or an alternative death of the patient. Treatment consisted of drainage of the knee, plus complete immobilization. Surgeons dealing with this situation freely recognized the inadequacy of therapy from the standpoint of recovery. At this time there came into prominence C. Willems, the Belgian surgeon, who championed the cause of immediate active and uninterrupted motion for all injured joints, clean or infected, beginning immediately after operation. To one who has dealt with the problem of joint sepsis this sounds little less than heroic for the patient. However, many patients submitted to the treatment and, since motion was preserved in the knee and the patient survived, the Willems principles were rapidly being adopted at the close of the War. With some modification, the kinetic idea was applied to civilian therapy by those men who had come through this experience.

Since the World War there have been added no new principles of surgical attack of the infected knee, but we have been presented with the highly important chemotherapeutic drugs. Some men have tried to rely upon these agents for sterilization of the infected and purulent joint, but this would seem to be contrary to good surgical judgment.

The time element is the fulcrum upon which success or failure of the treatment of knee injuries must hinge, plus respect for the established principles of surgery. Given a fresh wound, not more than six hours old, it should be possible to clean up the wound, excise devitalized tissues, remove foreign bodies and contamination, instill sulfanilamide, close the wound and expect healing with preservation of useful function in 90 to 95% of the cases, excepting those joints grossly destroyed.

Because of time or other uncontrollable factors, there are going to be some infected joints. Our approach at the Minneapolis General Hospital has been to give an infected joint adequate drainage by medial and lateral parapatellar incisions immediately upon diagnosis. We then give nature 48 hours in which to thrombose vessels and close the channels of infection leading from the incisions, following which motion is begun. This is at first assisted motion, with the active participation of the patient, but becomes entirely active as soon as the patient can be inspired to make the necessary effort. The extremity is best treated on a Thomas splint, hinged at the knee, and with slight traction to the lower leg, to distract the joint surfaces. This method has given satisfactory healing in the majority of cases. Ultimate function, however, seems to bear a direct relationship with the length of time of drainage from the wounds.

An interesting monograph has recently come out, written by Trueta, a Spanish surgeon, based on an extensive experience with wounds in the Spanish Civil War. These cases were all treated by the application of a closed plaster cast immediately following surgical

care. Infected joints were likewise immobilized following incision for drainage, apparently with satisfactory results. The book is being widely read and will no doubt have an influence upon the treatment employed in the present war. The conclusions reached after a further experience should be invaluable in crystallizing the attitude to be adopted toward the infected joint.

## TREATMENT OF WAR WOUNDS BASED ON THEIR BACTERIOLOGY

THEODORE H. SWEETSER, M.D.

Minneapolis

This paper is being published in full in the *Military Surgeon*. It is summarized as follows:

Early treatment of war wounds is much simpler and more effective than is treatment later after invasion of tissues by bacteria.

All patients should receive tetanus antitoxin as soon as possible. Those with devitalized muscle should receive the combined antitoxin for *Cl. welchii*, *Vibrio septique* and *Cl. oedematiens*. The antitoxin dosage must be larger for patients coming later for treatment.

Treatment of wounds during the early latent period should consist of debridement, drainage (in practically all cases), immobilization in plaster, and the use of one of the sulfonamide group of drugs in the wound and by mouth; subsequent dressings should be infrequent.

Treatment of patients arriving for treatment after establishment of definite infection require more conservative operative care, adequate drainage, immobilization in plaster with special precautions against tightening, and appropriate treatment of the infection found in the wound. The sulfonamide group of drugs is most effective; other drugs are discussed. Hypertonic packs, especially of sodium sulfate, have a field of usefulness.

Trauma, operative or otherwise, even many months after infliction of a wound, may reactivate a latent streptococcus or tetanus infection. Prophylaxis in such cases should include sulfanilamide and tetanus antitoxin.

Gas gangrene is a danger of the first two weeks, only when wounds contain devitalized tissues, especially muscle. The principal infecting organism is *Cl. welchii*, often in association with *Vibrio septique* or *Cl. oedematiens*. Virulence is increased by association with streptococcus. Conservative surgery and serum therapy offer the best results. Amputation may be necessary if the blood supply of the extremity is destroyed. Sulfanilamide may help. X-ray therapy has given good results according to some reports.

Streptococcus hemolyticus, often a secondary invader, is the cause of most of the deaths due to infection of war wounds. Sulfanilamide is the most effective weapon against it and should be used locally as well as by mouth.



## INJURIES TO THE EAR, NOSE and THROAT

LAWRENCE R. BOIES, M.D.  
Minneapolis

Several injuries are common and of special interest in the ear, nose and throat.

The ear is involved in:

1. External contusion, abrasion, laceration or loss of substance.
2. Concussion causing loss of hearing with or without rupture of the drum membrane.
3. About one-third of basilar skull fractures.

There is no purpose in discussing injuries of the external ear before a group of general surgeons inasmuch as the treatment of these is essentially no different from that of other soft tissue wounds on the surface of the body except in two respects. The presence of cartilage in the external ear as a supporting framework makes important a special consideration of hematomas to prevent external deformity. Hematomas should be aspirated and a mould of dental stent placed so that a pressure band will prevent a refilling of the hematoma. Also, when there is laceration of the canal, the problem of stenosis due to scar tissue may also arise. The necessity for a mold to keep the canal open should be borne in mind.

Traumatic rupture of the ear drum is a common form of injury in civil life. It is much more common among combatants in actual warfare. A small or medium sized hole in an ear drum will usually heal without any difficulty if the middle ear does not become infected. The patient should avoid nose blowing by occluding the nostrils, and the external canal should be kept occluded with cotton to prevent entrance of any foreign material.

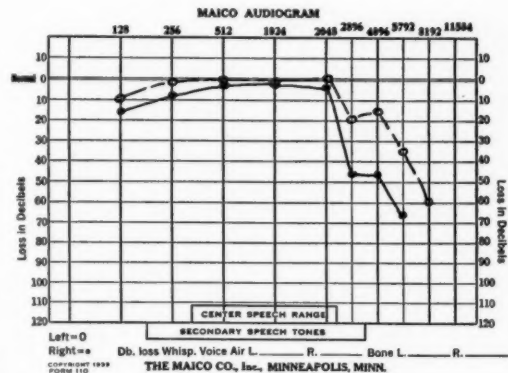
Studies have indicated that greater impairment of hearing may occur in instances of concussion in which the drum has not ruptured. Concussion from gunfire and exposure to the noise of airplane motors are the most common causes of ear damage in modern warfare. In the matter of gunfire the damage is not necessarily proportional to the intensity of the sound. In civil life damage is encountered occasionally in the use of ordinary firearms.

We do not have accurate information as to just what happens to the inner ear structure from concussion inasmuch as opportunity for removal of the temporal bone and its pathological study has only been done in isolated instances. Apparently the damage is one of transmitted shock to the organ of Corti, causing degeneration of nerve endings. The manifestations of this shock are tinnitus and a loss of ability to hear certain high notes.

The accompanying audiogram (Fig. 1) is one of a physician who experienced a ringing in his ears after firing a revolver at a target in a basement. This depression of hearing is characteristic of the loss from the concussion of gunfire.

The frequencies most used in ordinary speech are those of 512, 1024 and 2048. In this particular case, because it is the frequencies above this range which

are involved, the patient was not conscious of any particular difficulty in hearing. This individual has now been observed over several years. The tinnitus has disappeared, but there has been no recovery from nor any increase in the impairment.



It has been estimated that the temporal bone is involved in about one-third of the fractures of the base of the skull. There are two types which extend into the ear. In one, the fracture line extends along the pyramid in the apex to base direction and through the middle ear into the external ear canal. There is blood in the middle ear and external canal from a tear in the drum membrane. However, the inner ear frequently escapes from any permanent damage. In the other form the fracture line extends across the base of the pyramid causing a sudden and permanent destruction of vestibular and cochlear function. There is no bleeding in the external canal because the drum membrane is not torn, but there may be bleeding into the middle ear. When there is bleeding into the middle ear and the fracture is simple, myringotomy is not performed because of the danger of the blood clot becoming infected by way of the opening in the drum membrane. When, however, there is bleeding into the middle ear and the fracture is compound, but without a rupture of the drum membrane, or if there is a rupture but the drainage is unsatisfactory, a myringotomy is performed to prevent, if possible, a potential infection in the blood clot. Otherwise, treatment, insofar as the ear is concerned, consists of taking precaution against the onset of upper respiratory tract infections.

The prognosis as to recovery of ear function, both cochlear and vestibular, depends on certain findings on objective examination. It is not within the purpose of this discussion to consider these tests in detail. When the vestibular and cochlear reactions are obtained on the side of the fracture, the prognosis is good for recovery of freedom from any equilibratory disturbance and of useful hearing. If the vestibular reactions are totally lost, the prognosis is good for recovery of freedom from any equilibratory disturbance, but poor

for useful hearing. The usefulness of positive cochlear reactions in an ear included in a basal fracture is that when hearing is retained, the vestibular function is also preserved, and the prognosis is good for recovery from both the vestibular and cochlear disturbance of functions.

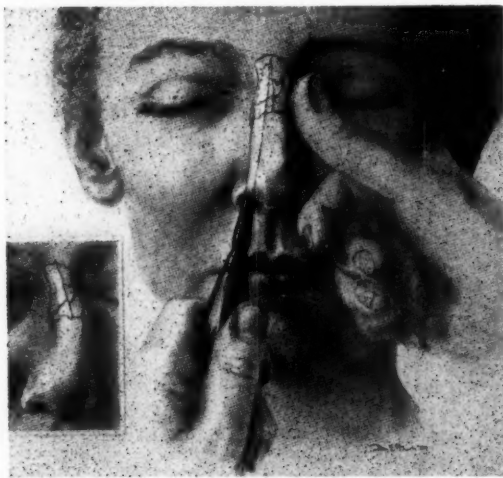


Fig. 2.  
(From *The Broken Nose*, Page 99, Vol. 1, by L. R. Boies in *Specialties in Medical Practice*. Thomas Nelson & Sons.)

Probably the most common fracture in civil life is the broken nose. It is also the most poorly treated—probably for two reasons. One reason is that the patient does not seek medical attention early due to the absence of any obvious gross deformity aside from that considered to be due to soft tissue swelling. The other reason is that the physician may wait for the swelling to subside before deciding that there is a fracture.

There are essentially three types of nasal fracture. In the simplest type, one nasal bone is depressed medially. Usually both nasal bones are dislocated and the whole bridge is displaced laterally. Often the bridge is flattened as well as displaced laterally. Reduction requires lifting from within with an elevator so as to lift the bridge into position as illustrated.

The broken nose should be reduced promptly unless the treatment of other injuries such as skull fracture makes it inadvisable to submit the patient to even the small amount of manipulation required for the ordinary nasal fracture.

Reduction is a simple procedure in the majority of cases.

The average nasal fracture, if reduced within a few hours after the injury, and often even within a day or two following the injury, will maintain normal position without special splints applied to the exterior or packing within. The reduction can satisfactorily be

done in adults under local anesthesia—cocaine to the nasal fossa. Some surgeons also inject the infraorbital nerves.

Associated fracture of the superior maxilla is not uncommonly found along with nasal fracture. Therefore, when there is any suspicion of trauma to the anterior maxilla, palpation of the orbital rim, inspection of the zygomatic contours, and testing the superior alveolus for rigidity is indicated. X-ray studies should supplement this examination.

X-ray studies for determining nasal fracture are not very useful as a factor in determining treatment. The x-rays do not reveal accurately the type and extent of dislocation.

The most important form of trauma to the throat requiring special consideration is that to the larynx. The effect of this, like the effect of trauma elsewhere, may be psychic and anatomic. The psychic form is often confused with malingering. An individual receives a blow across his "Adam's Apple" and apparently cannot phonate afterward.

Examination may reveal possibly a slight interference with motility at first, but normal movement, color, and innervation in the presence of continued aphonia indicate that the patient can phonate once he is convinced that he is capable of doing so.

Anatomic trauma to the larynx is very common in such simple forms as occur from vocal abuse, tobacco smoke, etc.

In treating lacerations or severe contusions of the larynx, the latter occasionally accompanied by fracture, certain facts must be borne in mind:

1. Cartilage repairs poorly. The repair of cartilage is poor anywhere in the body, but it is especially poor in the larynx.

2. In lacerations of the larynx, attempts to close the wound or stitch the divided cartilage is a mistake. The wound should be packed open until danger of virulent infection is over and the fibrous union of the cartilage has been completed.

3. If the internal perichondrium is penetrated, the seriousness of the situation becomes very much greater.

4. A high proportion of cases of trauma to the larynx produce laryngeal edema with resultant dyspnea and the threat of asphyxia. These symptoms may come on quickly—in the final stage precipitately. Consequently, if there is a possible delay in getting the patient to a hospital, someone should stay with the patient prepared to do a tracheotomy. Hesitation to do a tracheotomy in time occasionally loses a life which might have been saved.

I have heard remarks by surgeons to the effect that tracheotomy carries a high mortality. This is not so. In 1937 I reported an experience in 65 consecutive tracheotomies done on our laryngologic service at the University. We had four mortalities in this group and all four could be reasonably attributed to serious disease with which the patient was afflicted rather than the treatment.

Tracheotomies, of course, should always be low. The old terms of "high" and "medium" have been discarded.

Another caution—beware of morphine in the patient with dyspnea or impending asphyxia.

Obviously the examination of the patient suffering from trauma of the larynx should include in addition to the external examination, an indirect and often a direct view. The general surgeon does not take advantage of his frequent opportunities to use a laryngeal mirror as much as he should. Also the opportunity for direct examination is now available inasmuch as most if not all of our city hospitals are equipped with the Flagg Laryngoscopes for inserting the tubes for intratracheal anesthesia or as an air and oxygen way while using the intravenous anesthetics. The obstetricians and pediatricians are also employing the laryngoscope to aspirate the newborn.

### THE TEMPORARY TOURNIQUET AMPUTATION

STANLEY R. MAXEINER, M.D., F.A.C.S.  
*Minneapolis*

During a recent trip south I saw an article in the San Antonio paper to the effect that an airplane pilot had crashed and sustained such a mutilating injury to both legs that double amputation was necessary. The article further stated that the pilot promptly died following the shock of the accident and the operation.

The experience gained during the first World War, which has been substantiated many times since, taught us to delay operation in selected cases until the patient recovered from the shock or until his general condition improved. The temporary tourniquet amputation makes delay in amputation possible and undoubtedly many patients may be tided through an emergency when immediate surgical amputation would prove fatal.

The procedure consists of very tightly wrapping several loops of gum rubber tubing about the extremity at the lowest possible point at which the member must be sacrificed. In order to control infection and putrefaction in the dead distal extremity the part below the tourniquet is wrapped in 10 per cent formaldehyd dressings encased in rubber sheeting. The initial pain is overcome by the use of hypodermics of morphine or the rectal administration of sedatives such as sodium amytal. Much to our surprise, however, there has been practically no pain after the first few hours, as the tourniquet produces anesthesia.

We claim no originality for this method nor is it new, having been used by Dr. Farr and myself more than twenty years ago. We have employed the method in twelve or more cases to date with extreme satisfaction and no complications such as secondary hemorrhage.

The following case reports demonstrate effectively the type of patients in which the temporary tourniquet amputation is applicable.

#### Case Reports

*Case 1.*—A young male adult, while reaching across a circle saw, severed most of the tissues just distal to the axilla. When seen at the end of 48 hours he was

in extremely critical condition, his temperature was 102°, his pulse 120 and practically the entire arm below the injury was infected with gas bacillus. The skin was dark, there were no pulsations and no sensation. The general condition of this patient was so critical that in the opinion of those who saw him, he would not stand a surgical amputation.

A tourniquet was placed as high up on the arm as possible and the distal arm wrapped in 10 per cent formaldehyd. Several areas over the shoulder which crepitated were incised and Dakin tubes were introduced. The patient soon began to improve and his temperature and pulse fell to normal within a few days. One week after his entrance to the hospital the condition of the patient was such that he was taken to the operating room and it was found that the tourniquet had cut through all of the soft tissues and it necessary for us to divide only the bone. At a subsequent date a plastic operation covered the denuded surfaces. The patient made an uneventful and rather rapid recovery.

*Case 2.*—Mr. E. E., aged 50, fell head foremost beneath a train and the wheels severed both arms at the elbow joints. When first seen by us the patient was almost moribund with a blood pressure of 0/0. He was treated with oxygen, transfusion, stimulants etc. and at the end of three and one-half hours his condition permitted a temporary surgical amputation of the right arm. He was given prophylactic tetanus and gas bacillus antitoxin. A tourniquet was wrapped around the left arm at the lowest point of viable tissue. Forty-eight hours later he had a rapid rise in temperature, a chill and gas bacillus infection was found in the left arm above the tourniquet. The patient was again returned to the operating room and the left arm amputated surgically. Dakin tubes were introduced for his gas bacillus infection. Subsequent plastics were necessary on both arms but he made a very satisfactory recovery.

At the time of the accident the patient survived one amputation with difficulty. The tourniquet permitted us to delay operation on the other arm until his general condition permitted. Gas bacillus infection in the left arm certainly would not have occurred if, in our eagerness to conserve all possible tissue, we had not placed our tourniquet too low. During the second operation it was quite obvious that hemorrhage, muscle laceration, etc., had occurred proximal to the site of the tourniquet.

*Case 3.*—A male adult, aged 78, was struck by a truck, sustaining compound, comminuted fractures of the tibia and fibula and severance of the soft tissues of the calf of the leg, including the vessels, nerves and muscles. There was no sensation and no pulsation below the knee. The patient was taken to the General Hospital in severe shock where he was treated in the emergency room and given 750 cubic centimeters of blood. He was subsequently moved to a private hospital where he entered our care. He was still in shock. His systolic blood pressure ranged from 80 to 90 but his skin was cold and his general condition was poor.

The original tourniquet was removed and an elastic rubber tube tourniquet wrapped about the leg at the level of the knee. The leg below the tourniquet was wrapped in 10 per cent formaldehyd and encased in a rubber sheet. The patient was given an additional 600 cubic centimeters of blood but his general condition was bad. Part of the time he could not be aroused and we felt that amputation at that time was definitely contra-indicated. At the end of twenty-four hours his condition was greatly improved. His blood pressure was 140/70. The next day he was taken to the operating room and under local anesthesia a mid-thigh amputation was performed. He was subsequently given several transfusions and other supportive treatment.

The patient had a rather stormy convalescence but we were fortunate to have primary healing of his flaps. On the sixteenth postoperative day the patient developed bronchopneumonia from which he recovered, and he was discharged from the hospital on the twenty-sixth day with the flaps completely healed.

*Case 4.*—Mrs. S. H., aged 58, who was referred to us through the courtesy of Dr. W. K. Foster, had been a victim of arthritis and heart disease for a long period of time. On February 27, 1941, when seen by Dr. Foster the patient gave a history of very severe pain in the left leg six days previously and a second attack with violently severe pain in the right leg three days previously.

On examination the popliteal vessels were found to be completely occluded with a beginning gangrene of the left foot and left leg. The right leg had undoubtedly started as a popliteal occlusion but the thrombus had formed until it now occluded the deep femoral vessel and gangrene had already extended well up on to the thigh. The patient was in extremely critical condition with decompensation and auricular fibrillation and at times delirium.

She was treated medically for several days and was presented clinically to the Surgical Section of the American College of Surgeons meeting in Minneapolis as a problem case. We all agreed that inasmuch as the patient was improving and both legs were undergoing a dry gangrene, it was better to let the patient alone. However, a few days later she became progressively more toxic with elevation of temperature and it was quite obvious that the right leg was the cause of her relapse. A piece of gum rubber tubing was wrapped tightly around the thigh at the lowest point at which the amputation might be considered successful. The distal leg was wrapped in formaldehyd dressings covered with rubber sheeting. At the end of nineteen days the patient was very greatly improved. The tourniquet had cut through all of the soft tissues and the bone was severed. The patient's condition improved materially during the time that the tourniquet was cutting through the thigh and since the amputation, her temperature has returned nearly to normal and her pulse and heart action are greatly improved. Surgical amputation on this patient at any time since we have seen her would have been fatal. However, she has stood the tourniquet amputation without any apparent ill effect on her already critical condition. We are now contemplating a tourniquet amputation of the other leg.

In this case, because of the high thigh amputation and the possibility of secondary hemorrhage from the femoral artery, a sterile tray with Kirchner wires and tourniquet was maintained in constant readiness in the patient's room. The Kirchner wires naturally were to keep the tourniquet from slipping off when applied in such a high position.

Part of the twelve cases have been successfully treated by this temporary expedient at the Veterans Hospital.

### Conclusion

The temporary tourniquet amputation has been called to your attention because we believe that it has sufficient merit to tide certain patients over a period in which immediate surgical amputation might prove fatal. We have had no occasion to regret its use. It should not at any time be considered a substitute for surgical amputation except in those instances where the indications exist. Surgical amputation may be employed at the end of one or two days when the patient's general condition is sufficiently improved, or one may quite well wait for a week or more, at which time it will be found that the tourniquet has cut across all of the soft tissues and only the bone need be severed to obtain a guillotine amputation. Naturally, some type of plastic or skin graft will be required to cover the end of such a guillotine amputation stump.

### THE EARLY COVERING OF GRANULATING AREAS WITH THE SPLIT SKIN GRAFTS

H. O. MCPHEETERS, M.D.  
Minneapolis

Dr. McPheeters gave a general discussion of the subject of skin grafting and briefly reviewed the various methods. He said that the specialists in this work had come to some very definite conclusions as regards it:

1. All efforts must be toward covering the damaged area as quickly as possible. This would tend to prevent the usual scar tissue formation and shorten the loss of time.
2. All necrotic tissue must be removed.
3. The infection must be practically nil before any attempt at grafting was done.
4. A firm vascular granulating bed was preferable to the coarse hydropic type of granulations.
5. The thinner the graft the better the chance of a good take.
6. Firm pressure must be maintained over the graft for 10 days postoperative and as a rule the dressings were not changed for 5 days. The part must be absolutely immobilized.
7. The graft over a granulating bed is best when kept moist with normal saline postoperative.
8. The donor area is best dressed with 4 per cent xeroform ointment in a fine meshed gauze and not looked at for 10 days. As a rule it is healed and dry at that time.

Dr. McPheeters then showed the Padgett Dermotome, a new instrument for removing grafts of any desired thickness, and discussed its use. Several slides were then shown demonstrating the actual technique.

### MEDICINALS IN CHINA

War frequently brings about unlooked for changes. One of these is the reversal in attitude by the masses of the rural population in China toward Western medicines. The customary antipathy in this respect has been largely dispelled; Chinese manufacturers of medicinals are looking forward to an expansion of their trade in the future. The opening of transportation routes to the interior resulting partly from the exigencies of war also is playing a part in increasing trade in medicinals in China. The greater part of China's requirements in pharmaceutical, medicinal and biologic preparations are met by imports, the approximate value of which reached \$5,775,000 in 1939.\* Nevertheless, the domestic industry has expanded and within the past year great progress has been made in the manufacture of biologic preparations, though 70 per cent of the ingredients are still imported. The fact that eight large manufacturing establishments in Shanghai are producing proprietary medicines, vaccines, serums, antiseptics, anesthetics and general hospital supplies gives an idea of the activity in this field.—*Jour A.M.A.*, May 24, 1941.

\*News Edition, J. Am. Chem. Soc., 19:261, (March) 1941.



## PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of February 12, 1941

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 12, 1941. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. John M. Armstrong.

There were forty-one members and 2 guests present.

Minutes of the January meeting were read and approved.

There being no old or new business, the scientific program followed immediately, and consisted of the following case reports.

### DISLOCATIONS OF THE ELBOW JOINT

Report of Three Cases

A. W. IDE, M.D.

*Saint Paul*

Dislocation at the elbow joint is of rather frequent occurrence. In the adult, it is next in frequency to dislocation of the shoulder. This is because of the extreme mobility of the joint. It is capable of movement in a variety of directions. The leverage is great on account of the long bones involved in the joint.

In early life, it is the most frequent joint to be dislocated. During this period, the joint structures are slow in developing. The coronoid and the olecranon, that are so important in stabilizing the joint, are poorly developed in children. The epiphyses are much weaker and are more subject to injury than is the adult bone. The epiphyses may be slightly loosened from their attachments even without x-ray evidence.

The early writers on this subject were very much handicapped in the study of these lesions until the advent of the x-ray. Much of their information came from postmortem specimens. Further, they were apt to consider primarily the dislocation and disregard incidental injuries to bone and soft parts.

The early classifications were very elaborate, for example: dislocations of the forearm were divided into: (a) backward, (b) forward, (c) outward, (d) inward. Each of these subdivisions was divided into four or five subheadings.

In this connection, it is interesting to note the method described by Sir Astley Cooper in the early eighties:

*Slide 1.* This illustration was taken from Stimson's book on dislocations that was published in 1888. It illustrates the method used in reducing dislocations at the elbow joint at that time. This method of reducing backward dislocations of the elbow was described by Sir Astley Cooper as follows:

"The patient is made to sit down upon a chair, and the surgeon, placing his knee on the inner side of the elbow joint, in the bend of the arm, takes hold

of the patient's wrist, and bends the arm. At the same time, he presses on the radius and ulna with his knee, so as to separate them from the os humeri, and thus the coronoid process is thrown from the posterior fossa of the humerus; and whilst this pressure is supported by the knee, the arm is to be forcibly but slowly bent, and the reduction is soon effected. It may also be accomplished by placing the arm around the post of a bed, and by forcibly bending it, while it is thus confined."

Later, Scudder wrote:

"As Stimson has so well insisted, in the reduction of any dislocation, the dislocated bone should be reduced by the same path along which it came when dislocated. A haphazard method of reduction of a dislocation is unsurgical."

Scudder described a good method of reducing a posterior dislocation:

"The best method of reducing a dislocation of the forearm backward, when uncomplicated, is by two steps: first, by completely extending the forearm thus freeing the coronoid from the olecranon fossa and the posterior surface of the humerus; and, second, by direct traction and then flexing. Reduction is best accomplished by the aid of an anesthetic."

It is usually accepted that backward dislocation of both bones of the forearm is the most frequent dislocation at the elbow and this injury is frequently seen.

As examples of this backward dislocation, I am reporting these cases.

*Case 1.*—J. P., a woman, aged fifty-seven, was visiting at a country place and on the evening of July 15, 1940, she was hurriedly called out of doors. As she stepped off the porch, she fell. In an effort to save herself, she fell on the outstretched left hand, injuring the left elbow. She was seen shortly after the injury and immediately brought to the hospital. X-ray examination showed a posterior dislocation of the left elbow. No other injury was demonstrated by the x-ray. The patient was immediately given a general anesthetic and the dislocation was reduced without difficulty. The arm was put up at an angle somewhat less than a right angle and supported with a sling. The flexion of the forearm was limited by means of adhesive plaster carried around the arm and forearm. After a week, the adhesive plaster was removed. The arm was carried in a sling and some motion was allowed. The patient had an uneventful convalescence and the end result was entirely satisfactory.

*Slide 2.* This illustrates two views of the backward dislocation. It will be noted that both the radius and the ulna are displaced backward. The coronoid process rests in the olecranon fossa. Anteroposterior view shows that both bones are dislocated backward. There appears to be no separation of the radius and ulna.

*Case 2.*—L., this patient was a woman fifty years old. During the evening of December 30, 1939, while

she was skating, she fell, injuring her right elbow. She immediately came to the hospital and was seen about one hour after the accident. X-ray disclosed a posterior dislocation. She was immediately given a general anesthetic and the dislocation was easily reduced. After reduction, the arm was placed in a sling. There was no tendency toward recurrence of the dislocation. Convalescence was uninterrupted, and the final result was satisfactory.

*Slide 3.* This shows two views of the posterior dislocation of the forearm and elbow. There is no evidence of fracture. There is considerable lateral displacement of the radius and ulna on the humerus. The coronoid process is resting in the olecranon fossa.

*Case 3.*—W., this patient was a woman, aged thirty-seven. She was thrown from a horse on the evening of July 4, 1940, and sustained an injury to the left elbow. She was brought to the hospital immediately. X-ray examination showed a posterior dislocation. Three hours after the injury, she was given a general anesthetic, and the dislocation easily reduced. The arm was held in moderate acute flexion with adhesive. It was kept in position for 10 days and the adhesive plaster was then removed. The arm was carried in a splint for another week. Moderate active motion was encouraged after ten days. The patient made an uneventful recovery and the final result was satisfactory.

*Slide 4.* This picture shows another posterior dislocation at the elbow. The coronoid process is posterior to the lower end of the humerus.

*Case 4.*—F. J. This was a fifteen-year-old girl. On January 3, 1940, while at home, she fell striking against the right hand. She immediately complained of her elbow. She was seen shortly after the accident. At that time she complained of acute pain on the inner side and in front of the right elbow. There was swelling in this region. X-ray picture showed that there was a fracture of the tip of the coronoid. It would seem that this patient very narrowly escaped a posterior dislocation. There was sufficient strength, however, to prevent the dislocation. The only damage was a fracture of the tip of the coronoid. With immediate immobilization and after-treatment, this patient made a good recovery.

*Slide 5.* This roentgenogram shows the tip of the coronoid fractured with some slight separation.

The next case which I will describe illustrates what seems to be a rather rare lesion of the elbow.

*Case 5.*—The patient (Carl S., Jr.) was a fifteen-year-old high school student. On August 18, 1940, this young man fell from a step ladder injuring the right elbow. He was seen two hours after the injury. It was evident that there was a severe injury to the elbow. A roentgenogram was immediately taken. The x-ray picture showed a partial dislocation of the elbow joint with a separation of the internal epicondyle. The separated fragment was dislocated downward and appeared to be in the sigmoid cavity of the ulna and between the ulna and trochlea.

The patient was given a general anesthetic and an attempt was made to correct the position of this fragment. Later, x-ray disclosed that this maneuver had not been successful and the fragment was still in practically the same position.

The following day, 24 hours after the injury, open operation was done under a general anesthetic. Incision was made along the inner border of the olecranon.

The ulnar nerve was displaced forward and the joint opened. A fragment from the internal epicondyle was found in the joint in the position as indicated by the x-ray. It was freely movable but attached by a firm band to the muscular insertion of the inner condyle. The attachment was cut and the fragment removed. The partial dislocation of the elbow was reduced and the wound closed. Recovery was uneventful and full function was restored.

*Slide 6.* This x-ray picture was taken immediately after the injury and shows two views of the injured elbow; anteroposterior and lateral views. The fragment can be seen in both of these views. It will be noticed that the lower end of the humerus shows where the epicondyle has been removed; pulled loose from its attachment.

*Slide 7.* This shows two views of this same elbow after operation. The dislocation has been reduced. The fragment has been removed. The absence of the internal epicondyle from the humerus is still noticeable.

*Slide 8.* This diagram was taken from Barbara Stimson's recent book on fractures and dislocations. It illustrates the position that this fragment took in this case. The internal epicondyle was torn loose and was brought down, possibly by muscle pull into the position shown by the heavy lined fragment in the picture.

This injury was recently described by Barbara Stimson:

"A common injury in childhood, this fracture is caused by forcible abduction of the forearm, tearing of a ligament, usually the epiphysis by muscle pull. It may be associated with dislocation of the elbow joint."

She also says that the fragment may, on rare occasions, be pulled out and lie between the ulna and trochlea as in this case.

Wilson says of this condition:

"The fracture line in the case of the lateral epicondyle may be extra capsular as the capsule is attached about its tip."

This case illustrates a separation of the lateral epicondyle with dislocation in the joint and is of special interest. It is probably quite rare. I believe that the best treatment is open operation with reduction of the fragment. If the reduction cannot be maintained, and particularly if the patient has completed his growth period, the fragment may be removed.

The incision used in this case was just internal to and parallel to the olecranon. It was very satisfactory. It was interesting to note that the fragment in the joint was firmly attached to its original site by a remnant of muscular insertion.

*Slide 9.* This illustrates the Van Gorder incision for old dislocation of the elbow joint. This picture was taken from Van Gorder's recent article. The vertical incision is made over the olecranon and extended upward. The tendon of the triceps is exposed and the incision is made across the triceps. In this way, a

complete exposure is made of the elbow joint. This incision is probably useful when a more complete exposure of the elbow joint is needed, as in neglected dislocation of the elbow joint.

# DIABETES WITH INFARCTION OF THE SPINAL CORD

GEORGE N. RUHBERG, M.D.

and

JOHN F. NOBLE, M.D.

*Saint Paul*

Neurologic manifestations in diabetes mellitus are usually due to changes in the peripheral nerves. Spinal

discolored spot, the size of a quarter, on the right great toe; (3) sensations in all fields absent below right costal margin; marked loss of sensation in same distribution on left; (4) absent Achilles and patellar reflexes, slight plantar flexion both lower extremities, and absent abdominal reflex. The urine had 1% sugar and a trace of albumen. White blood count was 11,800. Spinal fluid was slightly turbid and had a trace of globulin; cells 680; 723 mgs. % of chlorides; 43.9 mgs. % protein; a negative Wassermann. She was placed on a diabetic regime and was controlled adequately only after medical consultation. Subjective tingling appeared in the lower extremities, but the flaccid paralysis remained. She expired on the eleventh hospital day.

The gross anatomic findings at autopsy were as follows.

The tip of the right great toe showed a discolored, crusted lesion, apparently a healing gangrenous lesion.



Fig. 1. Low magnification view shows marked hyaline thickening of the intima of the arterioles. Note the marked narrowing of the lumen of the vessel.



Fig. 2. Higher magnification of the lesion shown in Figure 1.

cord complications are usually caused by: (1) degeneration of the motor cells of the brain stem and spinal cord, (2) degeneration of the intramedullary portion of the dorsal root fibers with secondary system degeneration producing a lesion like tabes dorsalis; (3) funicular degeneration of the posterior column. All these complications are usually intimately associated with the arteriosclerosis of diabetes. Because of the character of the vascular lesion and the extensive cord destruction it was thought the following case report was justified:

M. H., a single woman of fifty-nine, several weeks before admittance to Ancker Hospital, experienced pain of the right foot and discoloration of the right first toe. A diagnosis of diabetes and gangrene was made and hospitalization and management of this condition was carried out for six weeks. On discharge she was receiving 40 units of Insulin daily and was on a diet. The third morning after her discharge on sitting up in bed she was seized with such a sharp pain in the small of her back that she could not move for some time. It gradually eased and passed away within an hour. By that time numbness and paralysis had developed in both lower extremities from the hips down. She was then admitted to the hospital.

On examination the objective findings were: (1) flaccid paralysis of both lower extremities; (2) a

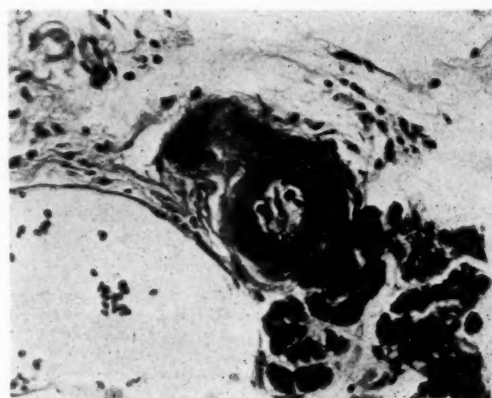


Fig. 3. Hyaline thickening of the arterioles of the pancreas. The lesion is similar to those seen in the spinal cord substance and similar lesions were found in other organs.

The leg was somewhat livid and on the lateral surface of the leg over an area about 5 cms. in diameter, numerous blebs were seen. The picture in the leg was that of a severe phlebitis or possibly arterial occlusion. The veins of the right leg were not dissected out, but the leg was milked upward and no thrombi could be

expressed. Over the sacrum there was a deep decubitus ulcer measuring 8x9 cms. Examination of the thoracic and abdominal viscera showed only the following

clinical picture of a transverse myelitis of extremely sudden onset. This clinical picture is better explained, I believe, by the thrombotic lesions.

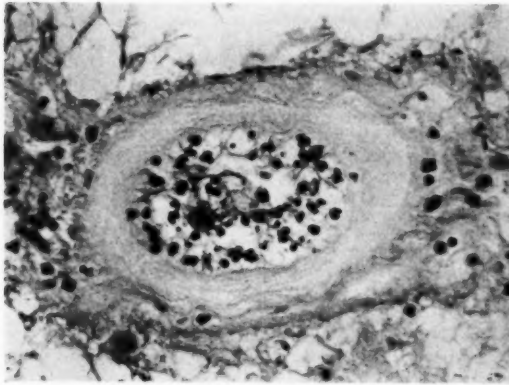


Fig. 4. Endarteritis with the proliferation of the intima and the infiltration of the vessel wall with acute inflammatory cells.

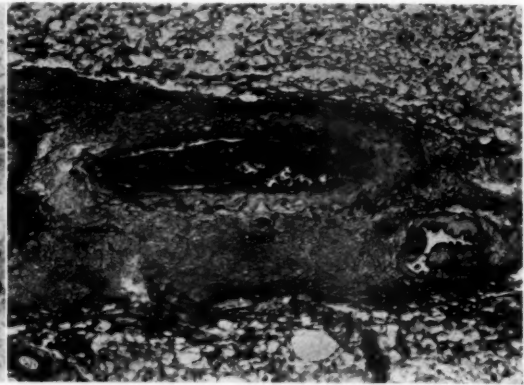


Fig. 5. A thickened arteriole with an occlusion of the lumen by a fresh thrombus.

positive findings. There was a large antemortem thrombus filling both the right and left branches of the pulmonary artery. This thrombus was not adherent and from its size it had probably had its origin from the large veins of the lower extremity. The gall-bladder was thickened and contained numerous stones. There was no evidence of obstruction to the common bile duct. The uterus contained several small leiomyomata.

The most interesting gross findings were observed when the spinal canal was opened. Here, it was found that there was a complete infarction of the spinal cord from the lower thoracic region downward to the terminal cord. In the thoracic region the spinal cord was found to be markedly softened and in the lumbar and sacral areas it showed complete dissolution. The process was, however, not sharply demarcated in the thoracic cord. In this area the marking of the cord gradually disappeared and the consistency of the cord became much more soft in the lumbar and sacral areas. The visible arteries of the spinal cord showed no abnormalities and examination of the brain showed no evidence of abnormality.

Microscopic examination of the spinal cord revealed the underlying etiology of the infarction. For the most part the cord structure was completely destroyed in the involved areas and three distinct vascular lesions were found to be present in the arterioles of the cord substance. The fundamental lesion is one which has been described by Dr. Bell as being almost pathognomonic of diabetes mellitus. The lesion is hyaline thickening of the intima of the arterioles which markedly narrows its lumen and in places practically occludes it. The width of the hyaline band and its homogeneous appearance are the distinctive characteristics of the lesion (Fig. 1 and 2). Arteriolar lesions of this type are found not only in the spinal cord, but also in the other organs chiefly pancreas (Fig. 3), spleen and kidneys. In addition to this lesion the arterioles of the spinal cord substance also showed an endarteritis in certain regions (Fig. 4). The arterioles of this type show an intimal proliferation and a distinct infiltration of the arteriole wall by acute inflammatory cells. In certain regions also the small arterioles show definite thrombi (Fig. 5). The more chronic lesions, namely the hyaline thickening of the arterioles and the endarteritis, could explain the infarction of the spinal cord but they are hardly an adequate explanation of the

#### Discussion

DR. GORDON R. KAMMAN, Saint Paul: Some one once said that to the clinical neurologist there is no term more euphonious than myelitis. One neurologist called it—"a heterogeneous subgroup of a larger heterogeneous group." I think this is borne out clinically. The pathological findings in this case do not prove to me that we are dealing with a massive capillary thrombosis of the cord. The blood supply of the spinal cord is plexiform so if there is a shutting off of one or more of the extraspinal vessels we do not see a sharp transition between the normal and the softened cord. In other words, the pathological picture is not identical with that of a transverse myelitis resulting from trauma. Clinically, Dr. Ruhberg has shown us there is a lesion of the mid-dorsal cord and Dr. Noble has shown the upper dorsal cord is normal. There is a not too gradual transition between normal cord and pathological nerve tissue. Why one must invoke an unknown clinical entity to explain the softened condition of the cord below the mid-dorsal region, is difficult for me to see. The cervical and upper dorsal cords are supplied by the anterior spinal arteries which arise from the vertebrals before they join to form the basilar artery. The lower cervical and dorsal cords are supplied by the intervertebral arteries which arise from the arch of the aorta and the subclavian arteries. The lower dorsal and the lumbar and sacral portions of the cord are supplied by vessels arising from the descending aorta. Inasmuch as arteriosclerosis affects the descending portion of the aorta we see arteriosclerotic changes in the lower part of the cord. Before concluding that this is the rare condition that Dr. Noble suggests, I would like to see serial sections of the anterior spinal arteries and possibly of the lateral spinal arteries. This is a very interesting case and it has been well presented.

DR. NOBLE (in closing): I think Dr. McKinley's suggestion that we are dealing with two processes is true. The thrombosis and the endarteritis may be explained as he has suggested on a strictly infectious basis and in all probability the portal of entry was, as he says, the gangrenous toe or perhaps the decubitus ulcer.

In answer to Dr. Kamman's suggestion, I neglected to mention that the anterior spinal artery was carefully examined both grossly and in microscopic section. While this artery shows evidence of mild sclerosis with slight calcification, we are unable to show any evidence of thrombosis.



# **PRIMARY CARCINOMA OF THE URETER** (Second Follow-up Report)

F. E. B. FOLEY, M.D.  
*Saint Paul*

Before Dr. Ireland presents the case report scheduled on the program this evening, I shall give very briefly a promised "second follow-up report" on a previously reported case of primary carcinoma of the ureter.

Some of you will recall that the original report of this case to the Academy was made November 9, 1938. Nephro-ureterectomy with excision of a piece of bladder wall surrounding the ureteral orifice was made in a woman aged sixty-nine, because of primary carcinoma affecting a considerable segment of the pelvic portion of the ureter. There was no evident extension of the growth through the ureteral wall and it was felt the surgical procedure was well calculated to permanently eradicate the growth. At the time of this first report, four months after operation, it was said, "Pelvic examination disclosed a small mass in the former position of the terminal portion of the right ureter. Whether this represented induration of the repair process or recurrence of the neoplasm was not certain at that time."

At the first follow-up report November 8, 1939, it was said, "The mass in the right side of the pelvis gradually became larger and it became evident that it represented recurrent growth of the neoplasm. Cystoscopy showed invasion of the bladder floor on the right side. A full course of deep x-ray treatment was administered by Dr. Schons. This does not appear to have had a favorable effect for at the last pelvic examination, October 17, 1939, the mass in the right side of the pelvis was definitely larger and cystoscopy showed some extension in the bladder." [At the time of this first follow-up report it was neglected to say that a biopsy from the "recurrent" growth in the bladder showed on histologic examination, only "Papilloma of the Urinary Bladder." The important bearing of this finding was neglected and actually the finding was discounted on assumption the growth actually represented recurrence of the ureteral tumor with invasion of the bladder.]

It was evident from the above that further progress of the growth to an eventually fatal outcome was anticipated.

The subsequent course has been surprising. On December 19, 1939, the patient reported she felt better in general than for a considerable time, had a good appetite, was gaining in strength and had no urinary symptoms. Pelvic examination showed the mass in the right side of the pelvis to be distinctly smaller than previously. Cystoscopy at this time showed four separate areas of tumor growth.

On March 4, 1940, there appeared to be a little further diminution in the size of the pelvic mass while cystoscopy showed very definite increase in the size of the bladder growths. A second full course of deep x-ray therapy was administered by Dr. Schons, but had no effect whatever on the bladder growths.

In August, 1940, there was profuse and persistent hematuria. For control of this, transurethral excision and electrocoagulation of the bladder tumors were made. Again histologic examination of the removed tissue showed only "papilloma, histologically benign."

Since the above the pelvic mass has not enlarged, cystoscopic examinations have shown no recurrence of the bladder tumors and the patient appears to be well.

It is evident that actually there were two separate and distinct tumors. The primary carcinoma of the ureter appears to have been cured by surgical excision and deep x-ray therapy. Benign papillary tumors of the bladder, misinterpreted as representing recurrence of the ureteral growths, were not affected by the irradiation but appear to have been permanently eradicated by transurethral excision and electrocoagulation.

## **AN UNUSUAL UROLOGIC CONDITION**

HARRY IRELAND, M.D. (by invitation), and  
FREDERIC E. B. FOLEY, M.D.

The case to be reported is that of a married woman, aged thirty-four, admitted to the Miller Hospital on May 26, 1940, and discharged June 21, 1940.

*Complaint.*—Cloudy urine, increased frequency of urination, burning on urination.

*Present Illness.*—In the summer of 1939 there was a period of amenorrhea for three months, followed by scant vaginal bleeding beginning in July. This continued until September 17, 1939, when an operation was performed for "an abscess of the abdomen."

(A clear account of the findings at operation and just what was done could not be obtained.) The patient stated she was very "septic" at the time and the incision drained for three weeks.

One month following the pelvic operation a dilatation and curettage were made. Following this pyuria, frequency of urination and burning on urination developed and occasionally blood was seen in the urine. Menstruation was reestablished but the flow was less and of shorter duration than formerly.

*Examination.*—(Significant findings only.) Temperature 98.8°, urine 60-70 pus cells per high power field, culture of bladder urine showed staphylococcus aureus, leukocytes 9,300.

Palpation of the abdomen disclosed tenderness in the right lower quadrant and a suggestion of a mass in this location. On pelvic examination an orange-size mass was felt close to the uterus on the right side.

Cystoscopy showed slight inward bulging of the right postero-lateral wall of the bladder. The mucosa over this area was hyperemic and at its center was a small rosette of papillary granulations. From the center of the granulations thick pus exuded, especially in response to pressure over the right lower quadrant. Tissue removed from the papillary rosette on histologic examination showed only inflammatory changes.

The urinary tract radiograph showed on the right side, within the pelvic ring, two small linear shadows each one about 1.5 cm. in length and 2 mm. in width. These shadows occupied a position somewhat medial to the normal position of the midportion of the pelvic ureter and did not appear to represent ureteral stones.

With a bulb catheter held snugly against the small opening at the center of the rosette of granulations, contrast medium was injected and both kidney pelvises were filled with contrast medium through ureteral catheters.

The bilateral pyelo-ureterograms and "outlined perivesical cavity" film showed a cavity about 4 cm. in diameter communicating with the bladder and appearing as a mottled shadow, suggesting content of thick semi-fluid material permeated by contrast medium. The small linear shadows localized in this cavity. Above this cavity the contrast medium appeared in another sharply defined dense shadow about 6 cm. long in vertical direction and 2 cm. in width in transverse direction. In addition to these accumulations of the contrast medium there was another irregular shadow overlying the right side of the sacrum. The left renal pelvis and ureter were normal. The right renal pelvis was dilated grade 1. The ureter was also dilated from the uretero-pelvic junction down to the pelvic brim, while below this point the ureter was of normal caliber. There was no evidence of any communication between the ureter and the previously described perivesical cavity.

The history and findings appeared to warrant a fairly confident diagnosis: Ectopic pregnancy with fetal death, infection and fistulous communication with the bladder.

**Operation.**—Mid-line incision below the umbilicus. Extra-peritoneal exposure of the bladder. The peritoneum was stripped away from the right posterolateral wall of the bladder exposing the site of the fistulous opening. A small accumulation of granulation tissue was present between the peritoneum and the bladder wall at the site of the small opening into the bladder. Lying in this granulation tissue were several small fetal bones, among them two long bones which apparently made the shadows described in the urinary tract x-ray film. In addition were a number of minute flat bones. Through the peritoneum an intra-peritoneal mass adherent to the right posterolateral wall of the bladder could be felt. This mass appeared to represent the perivesical cavity and right Fallopian tube which had been outlined by the contrast medium. An elliptical section of bladder at the site of perforation was removed and the bladder was closed. The peritoneum was then opened and a right Fallopian tube, containing the ectopic pregnancy close to its junction with the uterus and adherent to the bladder, was removed.

The operation was followed by an uneventful convalescence.

With the recent reappearance in the literature of several case reports dealing with suppuration as a complication of ectopic pregnancy, an old subject has again taken on new life.

Adair states that the first recorded ectopic pregnancy of any type is that of Albucasis, the Arabian physician, who, about the middle of the Eleventh Century, observed an "abdominal swelling which suppurated, opened and discharged a fetal skeleton."

The first case of extra-uterine pregnancy reported in America was that of John Bard, who in a paper read in London on March 24, 1760, described the case of a twenty-eight-year-old woman who retained a full term fetus throughout a succeeding normal pregnancy. Following her delivery of a normal child, Bard noted fluctuation in the "large hard indolent tumor," and the temperature was elevated. At operation fetid pus and a fetus which had died at term, were extracted.

W. Baynham and J. Augustine Smith each reported cases in the New York Medical and Philosophical Review in 1809 of retained ectopic pregnancies which suppurated and formed sinuses through the abdominal wall. The fetuses were removed followed by recovery of the patients.

Lawson Tait, in 1888, called attention to the fact that infected hematoceles were always the products of suppurating ectopic pregnancies which he believed had ruptured into the broad ligament.

Berry Hart in 1893 advanced the theory that infection in these cases occurred as a result of the close application of the gestational sac to the rectum. This view is expressed in many other writings on the subject but has recently been questioned by Falk, who reported a series of ten cases which had come under his observation within a period of eight years. Falk believes that the most common source of infection is from previous intra-uterine manipulation but concedes that infection may come from the rectum, intestines or from a coexisting salpingitis. He believes that the process begins with encystment of the blood followed by a fusion of the wall of the mass with the adjacent layer of visceral or parietal peritoneum. A mortality of 20 per cent is described in this series of cases of simple suppurating ruptured ectopic pregnancy.

Since cases of ectopic pregnancy are now usually recognized early in their course and come to immediate surgery, few progress to the stage described in 1876 by Benhan, who reported a case of extra-uterine pregnancy which discharged a macerated fetus of five months into the rectum. He believes that there were many comparable cases which ruptured into the bladder. This was but an opinion, however.

Chatterjee, in 1918, reported a case of four- to five-month ectopic pregnancy which burst into the rectum.

Clark, in 1932, cited a case of an extra-uterine pregnancy complicated by rupture into the sigmoid, which had adhered to the uterus subsequent to a previous operation.

Schewkt, in 1931, reported a seven-month pregnancy in which the fetus, after lying in the abdomen for three months post-rupture, eroded via the umbilicus, discharged a fetal tibia and required later operative removal of the remainder.

Brown is of the opinion that rupture of a simple pelvic abscess into the bladder is rare and Delbet, in reporting on one thousand cases of pelvic suppuration, stated that 12 per cent rupture into the rectum, 5.22 per cent into the bladder, 4.59 per cent into the vagina and 3.22 per cent to the skin. Levitsky, reporting on four thousand cases of puerperal disease, noted no perforation of the bladder. Abscesses of varied origin, however, have been reported to produce perforation of the bladder. Among these Heller reported a series of forty pelvic abscesses with rupture to the bladder, the abscesses emanating from infected dermoids, and Ewell added one comparable case from his practice and warned of the gravity and seriousness of such a complication.

Gustafson et al., in 1932, reported a case in which

the skeletal bones of a five-month-retained skeletonized fetus was extracted from the rectum. The clavicles, ribs, head bones and parts of the long bones were so removed and the patient recovered.

Alcorta, Lopez and Zamora, in 1937, reported the elimination of fetal bones through the bladder in a case from their practice. This case was further complicated by the presence of a vesicosigmoidal fistula and vesical lithiasis.

Kauffman, Finley and King, in 1938, also reported a case of a thirty-seven-year-old multipara who was first seen seven months following her last menstrual period at which time she complained of dysuria, milky urine, hematuria (on one occasion), occasional sudden urinary obstruction, passage of gravel in the urine and five attacks of colicky right flank pain, the pain radiating to the thigh. Malaise had been noted but no chills or fever. Upon examination a bone was found protruding from the urethral orifice and later four more bones were thus removed. A firm indurated mass was noted in the region of the right side of the bladder and right Fallopian tube. The urine contained blood and pus. X-ray examination revealed partially ossified and calcified material, pyelograms were normal and cystoscopy revealed a bullous edema in the right upper quadrant of the bladder. At operation a sinus tract was found perforating the right broad ligament near its base and entering the right quadrant of the bladder. The case terminated fatally on the seventh postoperative day. The authors could find no comparable case in the literature. This case is given somewhat in detail because of its marked similarity to the case reported here.

Historically it is of interest that the first recorded cases of ectopic pregnancy both of ancient and modern times were those of the retained variety which subsequently suppurated and extruded through the abdominal wall. Furthermore, this condition of retention and suppuration is more fully described in the older obstetrical and gynecological texts than in the modern ones. This is probably to be explained on the basis of the present infrequency of unrecognized and non-surgically treated cases—the retention and suppuration thus not being allowed to develop. The complication itself is not rare, as illustrated by the series cited above.

The case here reported illustrates one of the possible occurrences in those cases where the fetal skeleton has become well formed. No attempt has been

made here to arrive at the mechanism by which the infection is produced—the opinions are cited and the literature reviewed.

One must then conclude that a not infrequent sequel of neglected or undiagnosed ectopic pregnancy is suppuration, erosion and sinus formation to an adjacent organ—often a hollow viscus. The bladder would seem to be but rarely the site of such erosion. Cases of this type are difficult to diagnose and have a grave prognosis.

## DEMONSTRATION OF QUADRUPLLET PLACENTA

J. C. LITZENBERG, M.D.

Minneapolis

By courtesy of Dr. J. F. Hanna, I had previously had the privilege of examining the x-ray plate of this pregnant woman who gave birth to quadruplets in Fargo, North Dakota, a few days ago. The x-ray plate was taken a month or more before she delivered. These multiple births of more than two, of course, are very dramatic and attract a great deal of attention. I want to say that Dr. Hanna, who took care of her, is a man of very high obstetric standing and has handled the situation in a very ethical manner.

The woman was due to deliver in March, but, as so often happens in these cases, the babies were born a month prematurely. The x-ray was a rather poor picture from the standpoint of x-ray photography but it showed four heads distinctly.

Dr. Hanna kindly sent the placenta. The question is—whether there were two pairs of twins, one pair of twins and two other single pregnancies, four single pregnancies, or triplets and one single pregnancy. In fraternal twins there are always two placenta. Identical twins have one placenta. Minute study of the placenta and membranes only can determine just what transpired in this quadruple pregnancy. I shall take it to the University for detailed study. (The placenta and cords were shown.)

The meeting adjourned.

E. V. KENEFICK, M.D.,  
Secretary.

## EXPERIMENTAL STUDY OF SOLDIERS' CLOTHING

The Fatigue Laboratory of Harvard University, Cambridge, Mass., will undertake an experimental study under simulated field conditions of clothing for soldiers. Thirty volunteers will march on a treadmill for specified lengths of time between four and eight hours, but not oftener than once every ten days, wearing regulation army clothing and carrying full field equipment. Each of the thirty soldiers during these experiments will be subjected to studies of their water and salt balances and during the ten-minute rest periods will be weighed, have their feet examined and their temperature, pulse and blood pressure taken. The treadmill will be heated to simulate the heat of tropical countries, and the soldiers' fatigue reaction will be checked carefully. Conditions in the treadmill will be adjusted also to simulate conditions in various other climates. Efforts will thus be made to discover the best types of underwear, socks, shoes and later other articles of clothing. A study of the treatment of foot ailments will also be undertaken, as well as the possibility of replacing leather soles of shoes with cork or rubber or some other compound.—*Jour. A.M.A.*, May 10, 1941.

## ◆ OF GENERAL INTEREST ◆

A daughter, Mary Catherine, was born to Dr. and Mrs. Emmet N. Milhaupt of Minneapolis, April 22.

\* \* \*

Dr. and Mrs. A. V. Stoesser of Minneapolis are the parents of a son born, April 30.

\* \* \*

A son was born to Dr. and Mrs. William R. Murlin of Saint Paul, April 28.

\* \* \*

Dr. and Mrs. Larry Sass of Milwaukee were guests of Dr. and Mrs. F. M. McCarten on April 28.

\* \* \*

Orders for Dr. Albert T. Hays, first lieutenant, Minneapolis, to report for extended active duty with the United States Army, have been revoked.

\* \* \*

The weekly public health lectures, which have been presented in Rochester by physicians there for the past twenty years, have been discontinued.

\* \* \*

Dr. Paul F. Dwan has returned from Florida, where he and his family spent the winter, and he has resumed his practice in Minneapolis.

\* \* \*

Dr. James M. Hayes of Minneapolis announces the removal of his office to 1033-35 Medical Arts Building, Minneapolis.

\* \* \*

Dr. William R. Lovelace II of Rochester presented four addresses at the fifty-ninth annual meeting of the New Mexico Medical Society in Raton, May 26-28.

\* \* \*

The marriage of Dr. G. Willis Bass, Minneapolis physician, and Mrs. Frank E. Hills of New Hampshire, took place in Minneapolis, May 18.

\* \* \*

Mrs. Norman H. Baker (Dr. Maria Lieber Baker) of Fergus Falls is state chairman of the 1941 Health and Summer Round-Up of the Minnesota Congress of Parents and Teachers, Inc.

\* \* \*

Dr. Everett K. Geer of Saint Paul was elected to the council of the National Tuberculosis Association at the association's opening session, May 5, in San Antonio, Texas.

\* \* \*

Dr. Leon H. Flancher has resigned his position as staff physician at the Sand Beach Sanatorium in Lake Park, Minnesota, effective August 1. Dr. Flancher has been at Sand Beach since March, 1925.

\* \* \*

Dr. Berton J. Branton of Willmar addressed the March meeting of the Polk County Medical Society in Amery, Wisconsin, on the subject, "The Roles of Physician and Pharmacist."

Dr. F. E. Harrington of Minneapolis has been chosen to welcome the papal legate at the Eucharistic Congress in Saint Paul this month, as representative of the laity.

\* \* \*

Dr. H. A. Smedal of Rochester has been ordered to the naval air station in Pensacola, Florida, with the grade of lieutenant (junior grade), United States Navy.

\* \* \*

Among new fellows of the Mayo Foundation in Rochester is Dr. Robert T. Potter of Minneapolis, a graduate of the University of Minnesota Medical School.

\* \* \*

Dr. John L. McKelvey, head of the department of obstetrics and gynecology at the University of Minnesota Medical School, addressed a meeting of the Inter-Urban Academy of Medicine in Duluth, May 14. His subject was "Arteriosclerotic Toxemia of Pregnancy."

\* \* \*

Election of Dr. Cecil J. Watson of Minneapolis and Dr. A. R. Barnes of Rochester to membership in the Association of American Physicians is announced. The association conducted its annual meeting in Atlantic City, New Jersey, last month.

\* \* \*

Dr. W. A. O'Brien, director of postgraduate education at the University of Minnesota Medical School, spoke before the Jackson County Health Forum at Kansas City, May 21, on the subject, "Medicine Meets Middle Age Needs."

\* \* \*

Included on the program at the seventieth annual session of the California Medical Association in Del Monte, May 5-8, was Dr. Waltman Walters of Rochester, who presented a paper, "Surgery of Adrenal Tumors."

\* \* \*

Dr. Allen E. Magnuson, who has been associated with the Oliver Clinic in Graceville for the past two years, has established offices for the practice of medicine in Wheaton. Dr. Magnuson is a graduate of the University of Minnesota Medical School.

\* \* \*

At the annual clinic of the Ingham County Medical Society in Lansing, Michigan, May 1, Dr. John S. Lundy of Rochester presented a paper, "The Choice of an Anesthetic," and Dr. Owen H. Wangenstein of Minneapolis spoke on "Management of Abdominal Distention."

\* \* \*

Taking part in the eighty-second annual meeting of the Kansas Medical Society in Topeka, May 13-15, were Dr. Roger L. J. Kennedy of Rochester who spoke on "The Significance of Vomiting and Diarrhea in Infants"

(Continued on Page 502)





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501

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1. Knight, F., and Shelanski, H. A., "Treatment of Acute Anterior Urethritis with Silver Picrate," *Am. J. Syph., Gon. & Ven. Dis.*, 23, 201 (March), 1939.

(Continued from Page 500)

and Children," and Dr. Albert M. Snell of Rochester, "Changing Conceptions of Portal Cirrhosis."

\* \* \*

Dr. A. V. Stoesser of Minneapolis attended the meeting of the American Association for the Study of Allergy in Cleveland, June 2-4. Dr. Stoesser addressed members, June 3, on the subject, "The Influence of Acute Infections in the Progress of Infantile Eczema."

\* \* \*

Two fellows in surgery in the Mayo Foundation have been ordered to active duty in the Canadian military service. They are Dr. J. M. James, who has been assigned to the medical branch of the Royal Canadian Air Force; and Dr. W. J. MacArthur who has been assigned to the to the Canadian Army Medical Corps.

\* \* \*

Drs. W. J. McCarthy and H. B. Grimes, who for a number of years have practiced medicine in Madelia under the firm name of McCarthy & Grimes, are dissolving partnership. After June 15, Dr. Grimes will have offices in his own building, while Dr. McCarthy will maintain his office at its present location.

\* \* \*

Among the distinguished guests who will present addresses and clinics at the ninth annual assembly of The Omaha Mid-West Clinical Society in Omaha next October will be Dr. Albert M. Snell of Rochester, basic sciences; and Dr. John L. McKelvey of Minneapolis,

gynecology and obstetrics. The assembly is scheduled for October 27, 28, 29, 30 and 31.

\* \* \*

Among those whose names appeared on the program at the Louisiana State Medical Society meeting in Shreveport in April were Dr. John D. Camp and Dr. Virgil S. Counsellor of Rochester. The latter's subject was "A Consideration of the Fascia of Broad Ligament with Respect to Certain Surgical Procedures on the Pelvis."

\* \* \*

Dr. Donald C. Balfour of Rochester, director of the Mayo Foundation, was honored by McMaster University of Hamilton, Ontario, May 19, when the honorary degree of doctor of science was conferred on him. Dr. Balfour is a past president of the American College of Surgeons.

\* \* \*

Scheduled for release from publishers in June is a book, "The Control of the Communicable Disease" by Dr. Gaylord Anderson, head of the department of public health and preventive medicine at the University of Minnesota, and Miss Margaret Arnstein of New York City, former faculty member of that department.

\* \* \*

Dr. William T. Peyton, head of the division of neurosurgery at the University of Minnesota Medical School, has returned from a two-months' clinical tour in the East. Among meetings which he attended was the 143rd annual session of the Medical and Chirurgical

## OF GENERAL INTEREST

Faculty of the State of Maryland in Baltimore, April 22 and 23.

\* \* \*

Dr. Howard R. Ives, Jr., of Rochester, fellow in surgery in the Mayo Foundation for Medical Education and Research, is the first American physician to be accepted for service in Great Britain as a result of a call for volunteer doctors issued April 21 by the American Red Cross.

Dr. Ives, who has been in Rochester since January, 1940, will be in England for at least a year.

\* \* \*

Presiding at the sixty-sixth annual meeting of the American Gynecological Society held in Colorado Springs, Colorado, May 26-28, was Dr. Jennings C. Litzberg of Minneapolis, president. His presidential address was entitled, "Medicine in the Changing Social Order." Among the speakers was Dr. Robert D. Mussey of Rochester, whose paper was entitled "Pelvic Pain."

\* \* \*

Dr. Charles A. Evans, associate bacteriologist at the University of Minnesota, has been named one of seven winners of fellowship awards totaling \$13,600 for study of virus diseases. The award was announced by the National Foundation for Infantile Paralysis.

Dr. Evans' fellowship of \$2,100 will provide a year's work at the University of Rochester, New York, under Dr. George P. Berry, virus expert.

\* \* \*

When the Chicago branch of the American Association of Scientific Workers conducted a symposium on "Nutrition in Defense of Democracy," April 15, the guest speakers included Dr. Russell M. Wilder of Rochester, chairman of the committee on nutrition and foods of the National Research Council. Dr. Wilder's subject was "Nutrition in the United States—a Plan for the Future."

\* \* \*

Speakers at the ninetieth annual session of the Iowa State Medical Society in Davenport, May 14-16, included Dr. Charles W. Mayo of Rochester, whose address was entitled, "Surgical Treatment of Carcinoma of the Lower Portion of the Colon," and Dr. Fredrick A. Willius, Rochester, who spoke on "Certain Considerations of Coronary Disease" and "The Recognition of the Normal Heart."

\* \* \*

Dr. W. C. Alvarez of Rochester delivered the Alpha Omega Alpha lecture at the Women's Medical College of Pennsylvania in Philadelphia, May 7. He addressed the staff of Geisinger Memorial Hospital in Danville, May 8; a meeting of the Medical Society of the State of Pennsylvania in Williamsport, May 9, and a meeting of the Columbia Medical Society in Columbia, South Carolina, May 12.

\* \* \*

In 1940 the maternal death rate in Minnesota was 2.2 per 1,000 live births, which was a reduction of .5 from 1939 and an all-time low figure. The infant death rate of 33.3 per 1,000 live births was a reduction of .2 over 1939. We would like to match these



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figures with other states when their figures become available, as we have the impression they may be the lowest in the country and perhaps in the world.

\* \* \*

Election of two Rochester physicians, Dr. Philip H. Heersema and Dr. John Andrew Aita, to membership in the American Psychiatric Association has been announced by Dr. C. C. Burlingame of Hartford, Connecticut, chairman of the association's committee on public education. Dr. Heersema is a member of the staff of the Mayo Clinic and Dr. Aita is a fellow in neurology in the Mayo Foundation for Medical Education and Research.

\* \* \*

The United States Civil Service Commission announces a need for nurses in the United States Public Health Service, the Indian Service and the Veterans' Administration for service in hospitals and other medical centers throughout the United States, Panama Canal Zone and Alaska. Further information may be obtained from the secretary, Board of United States Civil Service Examiners, at any first or second class post office.

\* \* \*

Dr. Louis B. Wilson of Rochester, director emeritus of the Mayo Foundation, was elected an honorary member of the Drake University Gamma chapter of Phi Beta Kappa when he presented a paper, May 6, at the university in Des Moines.

Dr. Wilson has been asked to serve as consultant to the committee appointed by the National Board of Medical Examiners to study the question of certifying the general practitioner.

\* \* \*

Dr. Asher S. Chapman, a fellow in medicine in the Mayo Foundation, has been awarded the Van Meter prize offered annually by the American Association for the Study of Goiter.

The award was made for the best essay submitted concerning original work on problems related to the thyroid gland. Dr. Chapman, a graduate of Northwestern University Medical School, began his fellowship in October, 1938.

Dr. W. L. M. King, a fellow in surgery in the Mayo Foundation, was given second honorable mention for his essay on thyroid tumors. Dr. King, who was graduated from the University of Toronto Medical School, began his fellowship in July, 1938. He plans to return to Toronto in July.

\* \* \*

Guest faculty members at the University of Minnesota continuation course in Roentgen Diagnosis of Diseases of the Chest, May 22, 23 and 24, were Dr. LeRoy Sante, professor of radiology at St. Louis University School of Medicine, and Dr. Felix Fleischner, radiologist at Greenfield, Massachusetts, and formerly chief of the department of roentgenology at Wilhelmina Hospital in Vienna. Enrollment for the course was limited to physicians with special training in radiology.



## OF GENERAL INTEREST

Dr. H. S. Diehl, dean of the University of Minnesota Medical School, was in Chicago, May 30, to attend a meeting of the executive committee of the Association of American Medical Colleges.

In April Dr. Diehl was in Washington, D. C., to attend a three-day conference called by Surgeon General Thomas Parran of the United States Public Health Service to discuss the nation's health program in relation to national defense.

\* \* \*

Dr. Leo G. Rigler, head of the radiology department at the University of Minnesota Medical School, will speak at three meetings within the next few weeks.

On June 1 he will address the Indiana Roentgen Ray Society in Indianapolis, and on June 17 he will address a meeting of the American Society of X-ray Technicians in Hollywood. He will speak also at a meeting of the Upper Peninsula Medical Association of Michigan in Ironwood, July 16, on the subject, "Roentgen Examination of Acute Abdominal Diseases."

\* \* \*

Speaker at the graduation exercises of the St. Mary's Hospital School of Nursing in Minneapolis, May 11, was Dr. W. A. O'Brien of the University of Minnesota Medical School.

Dr. O'Brien also spoke at several high school commencement exercises, including the graduation class of Park Rapids High School, May 27; Ellendale, May 28; Sebeka, May 29; Eden Prairie, May 30; Coleraine, June 5. On June 6, he spoke at the graduation exercises of Holy Angels Academy in Minneapolis.

\* \* \*

Physicians who took part in the Continuation Course in Nutrition in the Public Welfare given at the University of Minnesota Center for Continuation Study, May 26, 27, and 28, included Drs. Irvine McQuarrie, William A. O'Brien, Gaylord W. Anderson, Ruth E. Boynton, John Boehrer, Harold R. Leland, Owen F. Robbins, L. F. Richdorf, Macnider Wetherby, and John Meade, all of the University of Minnesota Medical School; and Dr. Ray D. Williams, Mayo Foundation fellow in medicine.

\* \* \*


Among the speakers at the annual meeting of the American Urological Association in Colorado Springs, May 19-22, were Drs. William F. Braasch, V. S. Counsellor, J. L. Crenshaw and G. J. Thompson. Dr. Braasch presented a paper, "Prognosis in Bilateral Renal Tuberculosis," and Dr. Counsellor, a paper, "Ten Years' Experience in the Management of Cryptorchidism."

Dr. Crenshaw presented an exhibit, "Anomalies of the Kidney and Ureter," while Dr. Thompson participated in the discussion of several papers.

\* \* \*

The annual oration on medicine at the seventy-fourth annual session of the West Virginia State Medical Association, held in Charleston, May 12-14, was presented by Dr. J. A. Bargaen of Rochester. His subject was

JUNE, 1941



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**MEDICINE**—Two Weeks Intensive Course starting October 6. Two Weeks Course in Gastro-Enterology starting October 20. Four Weeks Course in Internal Medicine starting August 4. One Month Course in Electrocardiography and Heart Disease every month, except August.

**FRACTURES & TRAUMATIC SURGERY**—Two Weeks Intensive Course starting June 30. Informal Course every week.

**GYNECOLOGY**—Two Weeks Intensive Course starting October 20. One Month Personal Course starting August 25. Clinical Course every week.

**OBSTETRICS**—Three Weeks Personal Course starting August 4. Two Weeks Intensive Course starting October 6. Informal Course every week.

**OTOLARYNGOLOGY**—Two Weeks Intensive Course starting September 8. Informal Course every week.

**OPHTHALMOLOGY**—Two Weeks Intensive Course starting September 22. Informal Course every week.

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Dr. Edgar V. Allen of Rochester was another guest speaker, his subject being "Importance of Differentiating Psychoneurotic and Somatic Pain from Visceral Pain." Dr. Allen also addressed a meeting of the Philadelphia County Medical Society in Philadelphia.

\* \* \*

As vice president of the Society for Pediatric Research, Dr. Arild E. Hansen of the University of Minnesota Medical School acted as chairman of several of the sessions at the organization's meeting in Atlantic City, New Jersey, May 5 and 6. Also attending this meeting was Dr. Roger L. J. Kennedy of Rochester, who presented a paper.

Dr. Hansen has been elected to membership in the Society for Clinical Investigation. This organization held its annual session in Atlantic City last month also.

\* \* \*

An expansion and improvement program, to be worked out over a period of several years at an ultimate cost of between \$150,000 and \$200,000, is under way at St. Joseph's hospital in Saint Paul. Recently the hospital acquired the Capitol Annex, apartment building at St. Peter and Exchange Streets, and a tract with an 80-foot frontage on Tenth Street adjoining the hospital properties on that street. Four floors of the Capitol Annex, a ten-story structure, have been re-designed for use of the hospital personnel, and further changes for like purposes are contemplated.

\* \* \*

Dr. Raymond Bieter, professor of pharmacology at the University of Minnesota Medical School, was recently elected secretary of the American Society for Pharmaceutical and Experimental Therapeutics.

Dr. Bieter is the third person from the University of Minnesota to have held that office. Others were Dr. Edgar D. Brown, associate professor emeritus of pharmacology, who is now living at Paynesville, and Dr. Leonard G. Rowntree, Medical Division, National Headquarters, Selective Service System, Washington, D. C.

\* \* \*

Dr. Moses Barron, as president of the Minneapolis chapter of the American Friends of the Hebrew University in Palestine, presided at a meeting of that group May 12 in the Coffman Memorial Union, at which Dr. John L. McKelvey, head of the department of gynecology and obstetrics at the University of Minnesota Medical School, spoke. Other speakers included Dr. Theodore C. Blegen, dean of the University of Minnesota Graduate School, and Dr. Walter Fischel, professor of Oriental Studies at the Hebrew University in Palestine.

\* \* \*

Papers were presented at the sixtieth annual session of the South Dakota State Medical Association in Mitchell, May 18-20, by six physicians from the Twin Cities. Speakers and their subjects included: Dr. Vernon L. Hart of Minneapolis, "Heredity and Disease of the Skeletal System"; Dr. Willis H. Thompson, Minneapolis, "Bleeding Tendencies in the Newborn and Their

# OF GENERAL INTEREST

Prevention"; Dr. Henry E. Michelson, Minneapolis, "The Relationship of Dermatology to General Medicine"; Dr. Frederic E. B. Foley, Saint Paul, "Diagnosis and Treatment of Bladder Neck Obstruction"; Dr. Robert G. Allison, Minneapolis, "Progress of X-ray Technique," and Dr. James B. Carey, Minneapolis, "Chronic Gastritis."

\* \* \*

Six Minnesota physicians presented papers at the annual meeting of the North Dakota State Medical Association in Grand Forks, May 19-21. They were: Dr. Edward H. Ryneanson of Rochester, "Vitamins"; Dr. Elexious T. Bell of Minneapolis, "Pathology of Heart Disease"; Dr. Macnider Wetherby of Minneapolis, "Therapeutic Procedures in Chronic Rheumatoid Disease"; Dr. Walter A. Fansler of Minneapolis, "Cancer of the Large Bowel"; Dr. Henry E. Michelson of Minneapolis, "Disease of the Skin"; and Dr. William A. Coventry of Duluth, "Management of the Breech."

\* \* \*

Off the press are a series of books entitled, "Help Your Doctor to Help You," designed to give the interested layman practical information about the causes, nature, diagnosis and treatment of the disease covered. The series is sponsored by a board of medical authorities. Dr. Walter C. Alvarez of Rochester, professor of medicine in the University of Minnesota Graduate School, is editor-in-chief. Another Minnesota physician on the editorial board is Dr. Charles W. Mayo of Roch-

ester. The five volumes are: "Gallstones and Diseases of the Gallbladder," "Migraine," "Food Allergy," "Colitis," and "Gastric or Duodenal Ulcer."

\* \* \*

The Minnesota Society of X-ray Technicians, seventy in number, held a meeting in Stillwater on April 26. At the luncheon in the Stillwater Club rooms, E. V. Strand, M.D., made the welcoming address on behalf of the medical staff of the Lakeview Memorial Hospital. During the afternoon C. H. Sherman, M.D., gave a lecture on "An Economical Polygraph," with demonstration. Dr. W. R. Humphrey officiated as toastmaster at the dinner in the evening.

\* \* \*

The next examination for appointment as Assistant Surgeon, U. S. Navy, will be held at all Naval Medical Department activities August 11 to 15, 1941. Applications must be submitted by July 15, 1941. Applicants must have had at least one year of internship. For further information write to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

Examination for appointment as Acting Assistant Surgeon will be held June 23 to 26, 1941. Graduates of class A medical schools are eligible and those accepted after one year's internship in a Naval Hospital will be eligible for examination for appointment as Assistant Surgeon.

\* \* \*

On April 23, Dr. and Mrs. D. Kalinoff and daughter Helen of Stillwater, returned from Biloxi, Mississippi, where they spent several of the winter months.

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## OF GENERAL INTEREST

Mumps and measles are the most difficult diseases the Army has to control today, Colonel Kent Nelson, who is in charge of the medical section of the University of Minnesota ROTC, told the public health nursing institute at the forty-ninth annual convention of the Minnesota State Conference of Social Work in Saint Paul, last month.

Other physicians who spoke included Dr. Ruth E. Boynton, director of the University of Minnesota Student Health Service and a member of the Minnesota State Board of Health, who was chairman of the meeting; and Dr. A. J. Chesley, secretary and executive officer of the Minnesota Department of Health, who spoke on "Responsibility of the State Department of Health in National Defense."

\* \* \*

When the one hundred and first annual meeting of the Illinois State Medical Society was held in Chicago, May 20-22, three Minnesota men participated in the program.

Dr. Chester A. Stewart of Minneapolis presented a paper on "Tuberculosis: Its Two Clinically Demonstrable Phases of Development," and Dr. John D. Camp of Rochester presented a paper, "Osteoporosis and Its Relation to Systemic Disease." Dr. Owen H. Wangenstein, head of the department of surgery at the University of Minnesota Medical School, gave the oration in surgery, entitled "Rôle of the Surgeon in the Management of the Peptic Ulcer Problem."

\* \* \*

Several medical students at the University of Minne-

sota were awarded honors at the Cap and Gown Day convocation, May 29.

Honors given by the Southern Minnesota Medical Association went to Floyd John Lewis, gold medal and \$100 cash prize; and Norton Donald Ritz, certificate of merit.

The Rollin E. Cutts Memorial Prize of a gold medal and \$25 was awarded Herman Kabat.

Lawrence Peters was reappointed to the Shevlin Fellowship in Medicine.

Elected to Alpha Omega Alpha, honorary medical fraternity, were: Norton D. Ritz, Jacob Jacoby, George N. Kraenier, F. John Lewis, Herman Kabat, William E. Harris, Lewis A. Vadheim, C. Walton Lillehei, Ben Irwin Heller, Eleanor Botha, G. Roy Diessner, Robert A. Green, Stanley P. Stone, Donald W. Freeman and George E. Montgomery, Jr.

\* \* \*

Medical reserve corps officers ordered to extended active duty include:

Dr. Oscar Kozberg, first lieutenant, Moose Lake to Camp J. T. Robinson, Arkansas.

Dr. Alton Edwin Lindblom, first lieutenant, Minneapolis, Fort Crook, Nebraska.

Dr. Theodore Peter Mollers, first lieutenant, Mountain Iron, to Camp J. T. Robinson, Arkansas.

Dr. Robert Anthony Murray, captain, Aitkin, Engineer Replacement Center Infirmary, Fort Leonard Wood, Missouri.

Dr. Arthur Neumaier, first lieutenant, Lindstrom, fourth armored division, Pine Camp, Watertown, New York.

Dr. William Joseph Noonan, first lieutenant, Minneapolis, to Fort Leonard Wood, Missouri.

Dr. Ralph Victor Platou, first lieutenant, Minneapolis, C.A.S.C. Station Hospital, Fort Leonard Wood, Missouri.



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## OF GENERAL INTEREST

Dr. Maurice Lockhart Straus, first lieutenant, Saint Paul, 41st division, Camp Murray, Washington.

Dr. Donald Stark Branham, captain, Albert Lea, to 56th Coast Artillery Harbor Defenses, San Francisco.

Dr. Nathan Kenneth Jensen, captain, Minneapolis, Corps Area Service Command Station Hospital, Fort Snelling.

Dr. Robert Bruce Tubor, first lieutenant, Hibbing, to Camp J. T. Robinson, Arkansas.

Dr. Frederick Herman Wiechman, captain, Montgomery, to Station Complement, Fort Riley, Kansas.

Dr. James Leo Hanley, first lieutenant, Rochester.

Dr. Paul Christoph Doehring, Jr., first lieutenant, Rochester.

Dr. John Joseph Ederer, first lieutenant, Mahanomen, 9th Army Corps Troops, Fort Lewis, Washington.

Dr. Lloyd Clayton Gilman, first lieutenant, Atwater, 3d Army Corps Troops, Fort Ord, California.

Dr. Clarence Melchior Hartmann, first lieutenant, Fairfax, 3d Army Corps Troops, Fort Ord, California.

Dr. Stillman John Hathaway, captain, Proctor, 9th Army Corps Troops, Fort Lewis, Washington.

Dr. Walter Clinton Jump, captain, Kasson, 3d Army Corps Troops, Fort Ord, California.

Dr. Grant Edmund Olson, first lieutenant, West Concord, 30th Field Artillery, Camp Roberts, California.

Dr. Harry Allen Palmer, first lieutenant, Blackduck, Corps Area Service Command, Reception Center, Fort Snelling.

Dr. Ernest Sterling Palmerton, first lieutenant, Albert Lea, 85th Field Artillery, Camp Roberts, California.

Dr. David Howard Rolig, first lieutenant, Howard Lake, Corps Area Service Command, Reception Center, Jefferson Barracks, Missouri.

Dr. Leander Theodore Simons, captain, Saint Paul, Corps Area Service Command Station Hospital, Fort Leonard Wood, Missouri.

Dr. Lloyd Arthur Smith, first lieutenant, Balaton, 40th Field Artillery, Camp Roberts, California.

Dr. Clifford Theodore Wadd, first lieutenant, Janesville, 166th Station Hospital, Harbor Defenses, San Diego, California.

Dr. Richard Aurie Whitney, first lieutenant, Cambridge, 30th Field Artillery, Camp Roberts, California.

\* \* \*

Minnesota physicians who took part in the section programs of the ninety-second annual session of the American Medical Association in Cleveland, June 2-6, include:

*Section on Practice of Medicine:* Dr. Russell M. Wilder of Rochester, "Nutrition: A Public Health Problem"; Drs. George E. Fahr and J. S. LaDue of Minneapolis, "Therapeutic Efficiency of a Digitalis Glucoside, Digilanid C, in Congestive Heart Failure with Normal Sinus Rhythm" (lantern demonstration)—Dr. Arlie R. Barnes of Rochester opening discussion.

*Section on Surgery, General and Abdominal:* Paper, "Malignant Lesions of the Stomach: Importance of Early Treatment and Results" by Drs. Waltman Walters, H. K. Gray and James T. Priestley of Rochester. Dr. Charles W. Mayo of Rochester, opening discussion on "The Effect of Hot and Cold Applications to the Abdominal Wall and Also Hot and Cold Fluids Administered by Mouth on Gastric and Intestinal Secretory and Peristaltic Activity" by Dr. J. Dewey Bisgard of Omaha. Dr. James T. Priestley of Rochester, opening discussion on paper, "Embryoma of the Kidney" by Drs. William E. Ladd and Robert R. White of Boston.

*Section on Obstetrics and Gynecology:* Drs. Robert D. Mussey and Arthur B. Hunt of Rochester, "The Toxemias of Pregnancy: Their Classification and Aid to Management of Parturition."

JUNE, 1941

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**Section on Ophthalmology:** Dr. Henry P. Wagener of Rochester, opening discussion on "Retinal Phlebosclerosis" by Drs. Glen G. Gibson and Lawrence W. Smith of Philadelphia. Dr. Walter H. Fink of Minneapolis, discussion on paper by Dr. Hermann M. Burian of Hanover, New Hampshire, concerned with fusional movements in permanent strabismus.

**Section on Laryngology, Otology and Rhinology:** Dr. Horace Newhart of Minneapolis, opening discussion on paper, "Problems of the Hard of Hearing in Industry" by Dr. W. E. Grove of Milwaukee. Dr. Gordon B. New of Rochester, opening discussion on paper, "Diseases of the Salivary Glands" by Dr. A. C. Furstenberg of Ann Arbor. Dr. Anderson C. Hilding of Duluth, opening discussion on paper, "Prophylaxis of the Common Cold" by Dr. Theodore E. Walsh of St. Louis.

**Section on Pediatrics:** Paper by Drs. George B. Logan and Edward J. Baldes of Rochester, "Parallel Clinical and Electro-encephalographic Improvement in Epilepsy." Paper, "Hyperthyroidism in Childhood" by Dr. Roger L. J. Kennedy of Rochester.

**Section on Pharmacology and Therapeutics:** Discussions on various papers to be opened by Dr. N. W. Barker, Dr. Charles H. Slocumb, Dr. F. P. Moersch, Dr. Arlie R. Barnes and Dr. N. M. Keith of Rochester, and Dr. Moses Barron of Minneapolis. Paper, "Some Effects of Potassium Salts in Man" by Drs. N. M. Keith, A. E. Osterberg and H. B. Burchell of Rochester. Paper, "Therapeutic Effect of Diaminosulfone Glucoside on Experimental Tuberculosis" by Drs. W. H. Feldman and H. C. Hinshaw of Rochester. Paper, "Therapeutic Efficiency of a Digitalis Glucoside, Digilamid C, in Congestive Heart Failure with Normal Sinus Rhythm" by Drs. George E. Fahr and J. S. La Due of Minneapolis. Dr. Edgar V. Allen of Rochester is secretary of this section.

**Section on Pathology and Physiology:** Dr. Maurice B. Visscher of Minneapolis, member of the executive committee. Dr. Frank C. Mamm of Rochester, paper, "The Liver and Medical Progress."

**Section on Nervous and Mental Diseases:** Dr. Henry W. Woltman of Rochester, opening discussion on papers by Dr. C. Hunter Shelden of Pasadena, California, and Dr. Russell N. DeJong of Ann Arbor. Dr. E. J. Baldes of Rochester, opening discussion on paper by Dr. Frederic A. Gibbs of Boston.

**Section on Dermatology and Syphilology:** "False Positive Serologic Reactions for Syphilis Due to Smallpox Vaccinations (Vaccinia)" (Lantern Demonstration), by Drs. Francis W. Lynch, Saint Paul, and Anne C. Kimball and Ruth E. Boynton, Minneapolis. Paper, "Intraspinal Therapy of Neurosyphilis" by Drs. Robert R. Kierland and Paul A. O'Leary of Rochester. Also paper, "Verrucae Planæ and Epithelial Nevi" by Dr. Morris Waisman of Chicago and Dr. Hamilton Montgomery of Rochester.

## OF GENERAL INTEREST

*Section on Preventive and Industrial Medicine and Public Health:* Dr. Harold S. Diehl of Minneapolis, a member of the executive committee. "Occupational Hazards of the Business Executive" by Dr. Edgar V. Allen of Rochester.

*Section on Urology:* Dr. Frederic E. B. Foley of Saint Paul, a member of the executive committee. Paper, "Bladder Difficulties in the Tabetic Patient with Special Reference to Surgical Treatment by Transurethral Resection" by Drs. John L. Emmett and J. B. Beare of Rochester. Dr. Foley of Saint Paul and Dr. Edward N. Cook of Rochester were also scheduled to open discussions on papers to be given in this section.

*Section on Orthopedic Surgery:* "Benign and Malignant Giant Cell Tumors: Diagnosis and Result of Treatment" by Dr. Henry W. Meyerding of Rochester.

*Section on Gastro-Enterology and Proctology:* Dr. J. A. Barga of Rochester, section secretary. Paper by Drs. Charles W. Mayo and Edward Starr Judd, Jr., of Rochester on "Resection of the Right Colon for Nonspecific Ileocolitis." Paper, "Carcinomatous Gastric Ulcer Misleading Results of Medical Therapy" by Dr. George B. Eusterman of Rochester with Dr. John F. Weir of Rochester among those opening the discussion.

*Section on Radiology:* "Gallstone Obstruction: Pathogenesis and Roentgen Manifestations" (Lantern Dem-

onstration) by Drs. Leo G. Rigler and Chauncey N. Borman, Minneapolis, and John F. Noble, Saint Paul. Paper, "Tumefactive Lesions of the Small Intestine" by Dr. C. Allen Good of Rochester. Also paper, "Results of Radium Treatment of Cancer of the Uterine Fundus with Special Reference to the Microscopic Grade of the Lesion" by Drs. Robert E. Fricke and Charles O. Heilman of Rochester.

*Section on Anesthesiology:* Dr. John S. Lundy of Rochester, section secretary. "The Men Who Discovered Anesthesia" by Dr. Walter C. Alvarez of Rochester. Paper, "Effect of Certain General Anesthetic Agents on the Small Vessels of the Rabbit's Ear" by Dr. Thomas H. Seldon of Rochester with Dr. Edgar V. Allen of Rochester participating in the discussion. Dr. Ralph T. Knight of Minneapolis, opening discussion on a paper by Drs. Clayton P. Wangeman and Malcolm H. Hawk of Madison, Wisconsin.

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Minnesotans represented in the scientific exhibit follow:

Dr. Vernon L. Hart of Minneapolis, special exhibit on fractures; Dr. Earl C. Elkins, Rochester, special exhibit on lame backs.

Exhibits on National Defense and War Medicine: Drs. Gordon B. New and John B. Erich of Rochester, "Treatment of Traumatic Injuries of the Face"; Drs. Samuel B. Harper and A. E. Osterberg, Rochester,



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## BOOK REVIEWS

"A Simple Method of Preparing Dried Blood Plasma and Its Clinical Use"; Drs. Walter M. Boothby, W. R. Lovelace, C. W. Mayo and A. H. Bulbulian, "Physiologic Problems in Aviation Medicine."

Section on Practice of Medicine: Drs. W. H. Dearing, A. R. Barnes, H. E. Essex and J. F. Herrick of Rochester, "Effects of Toxic Doses of Digitalis, Pitressin and Prolonged Oxygen Deprivation on Heart, Brain, Electrocardiogram and Coronary Blood Flow in the Experimental Animal"; Drs. T. J. Dry and F. A. Willius of Rochester, "Life Expectancy in Various Types of Conduction Disturbances Affecting the QRS Complex."

Section on Surgery, General and Abdominal: Drs. Waltman Walters, Howard K. Gray and James T. Priestley, Rochester, "Malignant Lesions of the Stomach; Importance of Early Treatment and End Results."

Section on Nervous and Mental Diseases: Dr. Lillian Cottrell, University of Minnesota, Minneapolis, "Histologic Variation in Nerve Trunks with Age and Chronic Debilitating Disease." Dr. F. P. Moersch of Rochester is the representative to this exhibit from the Section on Nervous and Mental Diseases.

Section on Anesthesiology: Drs. Thomas H. Seldon and John S. Lundy of Rochester, "Effect of Certain General Anesthetic Agents on the Small Vessels of the Rabbit's Ear."

Among motion pictures shown were films prepared by Drs. Waltman Walters, Howard K. Gray and James T. Priestley of Rochester; Dr. Hamilton Montgomery; Dr. Paul A. O'Leary; Dr. Walter M. Boothby; Drs. Gordon B. New and John B. Erich; and Dr. James T. Priestley, all of Rochester. Dr. Frederic E. B. Foley of Saint Paul has also prepared two films.



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## BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

**YOUR TEETH.** Their Past, Present and Probable Future. Peter J. Brekhuis, B.A., D.D.S. Professor of Oral Diagnosis, School of Dentistry, University of Minnesota. Foreword by Irvine McQuarrie, Ph.D., M.D., Professor and Head of the Department of Pediatrics, University of Minnesota. 255 pages. Illus. Price, \$2.50, cloth. Minneapolis: University of Minnesota Press, 1941.

**ORAL PATHOLOGY.** A Histological, Roentgenological and Clinical Study of the Diseases of the Teeth, Jaws and Mouth. Kurt H. Thoma, D.M.D., Professor of Oral Surgery, and Charles A. Brackett, Professor of Oral Pathology, Harvard University. 1306 pages. Illus. Price, \$15.00, cloth. St. Louis: C. V. Mosby Co., 1941.

**FEEDING OUR OLD FASHIONED CHILDREN.** A Background for Modern Mealtimes. C. Anderson Aldrich, M.D., Associate Professor of Pediatrics, Northwestern University Medical School; Chief of Staff, Children's Memorial Hospital, Chicago, and Mary M. Aldrich. 112 pages. Price, \$1.58. Illus. New York: The Macmillan Company, 1941.

The authors have brought up to date in this, their entirely new manuscript, their book, "Cultivating the Child's Appetite," published in 1927. Its "personality build-up" is unique. The appetite problem is well depicted as more than a purely nutritional matter. The illustrations, so true to life, make the book very real.

LILLIAN L. NYE, M.D.

**CARDIAC CLASSICS.** Fredrick A. Willius, M.D., M.S. in Med., Chief, Section of Cardiology, The Mayo Clinic; Professor of Medicine, The Mayo Foundation for Medical Education and Research, The Graduate School, The University of Minnesota, and Thomas E. Keyes, A.B., M.A., Reference Librarian, The Mayo Clinic; Formerly Carnegie Fellow, The Graduate School, The University of Chicago. 846 pages. 103 illustrations. Price \$10.00. St. Louis: the C. V. Mosby Company, 1941.

The publishers state that they take pleasure in sending this book for review. Most certainly this reviewer takes pleasure in receiving it.

At the opening of the Pasteur Institute the great Louis Pasteur discussed two contrary laws which then opposed each other: "One a law of blood and death; the other a law of peace, labor and salvation." The 53 proponents of the latter law, whom Drs. Willius and Keyes have chosen as forefathers of cardiology, are



## BOOK REVIEWS

presented as though they were contemporaries, presenting epochal works of such caliber as to stimulate Abraham Lincoln's idealistic "Die when I may, I want it said of me by those who knew me best, that I always plucked a thistle and planted a flower where I thought a flower would grow."

It is patently impossible to review such a book as this otherwise than in generalities. The subject material is impeccable, otherwise it would not have survived to become classic. It therefore becomes a matter of reaction to the wisdom of the limitation of the list of contributors, choice and condensation of the works, and artistry of presentation.

For all three of these it would be difficult to imagine a more effective author-team source. There is the ability, facility, and the generally accepted conscientious simplicity and insistence on accuracy which insures the reader against the subjugation of truth by drama and romance. The careful reader will probably have his pleasure enhanced by the easy feeling that the authors have fully relieved him of any necessity for checking or questioning details. The more one knows Dr. Wil-lius, the more this feeling will automatically exist.

It would be quite contradictory to derive the foregoing impressions without subconsciously feeling that the material was tastily presented. The cover is attractive, the paper and printing are excellent, and the binding should set an example for many a publisher. A brand-new book opens pliantly at any page and stays fully spread without page-bending tactics so often required.

In brief, this reviewer thoroughly approves of the volume and feels:

- (a) that it lives up to its title as a classic,
- (b) that it would be good for the soul of every physician regardless of his specialty,
- (c) that it, or the equivalent of its contents, are essentials in the foundation of every internist in general and cardiologist in particular, and
- (d) it would be fascinating and stimulating to any intelligent person regardless of profession.

R. L. NELSON, M.D.

**ELECTROCARDIOGRAPHY IN PRACTICE.** Ashton Graybiel, M.D., and Paul D. White, M.D., Harvard Medical School. 319 pages. Illus. Price \$6.00. Philadelphia: W. B. Saunders Co., 1941.

This book presents a very thorough analysis of electrocardiology. The basic principles of the electrocardiogram are considered and a complete review of normal electrocardiograms and variations of same is presented. It is of particular value in the presentation of electrocardiogram interpretations from the standpoint of different types of cardiac disease. Another valuable portion is the large number of electrocardiograms which are presented for interpretation. This book would be a valuable addition to the library of any internist or general practitioner who is concerned with the study of heart disease.

S. H. BOYER, JR., M.D.

JUNE, 1941

## DIRECTORY OF MEDICAL SPECIALISTS

A second edition of the Directory of Medical Specialists has been authorized by the Advisory Board for Medical Specialties, to be ready for distribution in February, 1942, with its contents complete to January 1.

This Directory is the official publication of the Advisory Board, and will list the names of approximately 18,000 diplomates of the fifteen American Boards examining candidates for certification in the specialties. This is an increase of 4,000 over the first edition issued early in 1940.

The geographic grouping will give completely revised biographic data about each diplomate; there is an alphabetic index with addresses and specialty designations; and the plan of organization, officers, and examination requirements of each American Board are fully outlined in their various sections.

The biographic data of diplomates will not only be revised to date, but also will include much new information not found in the first edition. Details of formal training is one of these, and military appointments now held is another.

Only those who have been formally certified by one of the American Boards can have their names included, and all of these are included, there being no charge or obligation other than certification for such listings.

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## BOOK REVIEWS

The official nature of this Directory makes it invaluable as a reference book. It may be used generally for the referring of patients to distant communities; for the information of Medical Society officers; for gaining detailed knowledge about qualified specialists throughout the United States and Canada; for the obtaining of detailed information about the American Boards; and for many other purposes.

The first edition had a wide distribution not only throughout the medical profession as well as medical and other public libraries, but also among insurance companies and business firms dealing with physicians. Nevertheless, it is not a commercial undertaking as the Directory contains no advertising material, is underwritten by the Advisory Board and actually received subsidizing support so that it could be distributed as near to cost as possible.

Questionnaires for biographic data are now being mailed out with order forms. The Secretary of each Board urges that every diplomate return his questionnaire form as quickly as possible, and he is urged also to support this project of the American Boards by his subscription to the Directory. A substantially reduced rate is offered for prepublication orders, as the size of the printing is based largely on advance subscriptions.

The publication is issued through the Columbia University Press of New York. The Secretary of each American Board serves on the Advisory Editorial Board, and Paul Titus, M.D., 1015 Highland Building, Pittsburgh, Pennsylvania, of the American Board of Obstetrics and Gynecology, is the Directing Editor.

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